COMMERCIAL FERTILIZER

CONSOLIDATED WITH THE FERTILIZER GREEN BOOK

How NOT to make a cake

Making a cake is an excellent practice in the kitchen but something to avoid in the fertilizer factory.

One of the causes of caking is the tendency of fertilizer salts to show reversible reactions in taking up and giving off moisture.

By proper formulation, fertilizer mixtures, with fairly stable properties under ordinary humidity conditions, may be produced from salts individually inclined to "change with the weather."

How to avoid caking has been a subject of Nitrogen Division technical research for many years. Perhaps one of our technical service men can help you with your formulation problems. His services are available to our customers without charge.

Arcadian

PRODUCTS

Nitrogen Solutions (Nitrana® and Urana*)

•

ARCADIAN® Nitrate of Soda

•

A-N-L® Nitrogen Fertilizer

•

Urea Products

•

Sulphate of Ammonia

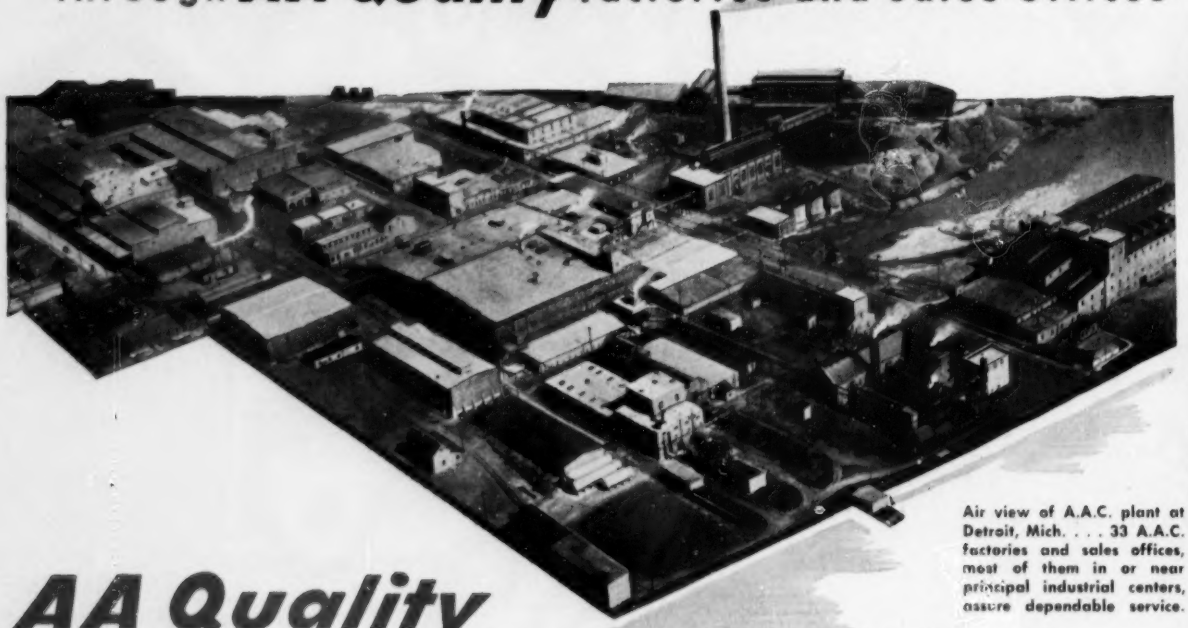
*Trade-mark

NITROGEN DIVISION Allied Chemical & Dye Corporation

New York 6, N. Y. • Richmond 19, Va. • Ironton, Ohio • Hopewell, Va.
Atlanta 3, Ga. • Columbia 1, S. C. • Omaha, Neb. • San Francisco 3, Calif

NITROGEN DIVISION ALLIED CHEMICAL

serving over 100 principal industries
through ***AA Quality*** factories and sales offices



Air view of A.A.C. plant at Detroit, Mich. . . . 33 A.A.C. factories and sales offices, most of them in or near principal industrial centers, assure dependable service.

AA Quality

for over 85 years
a symbol of quality
and reliability

principal *AA Quality* products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Commercial Fertilizers
Superphosphate — Sulphuric Acid
Insecticides and Fungicides
Phosphoric Acid and Phosphate
Phosphorus and Compounds of Phosphorus
Fluosilicates — Salt Cake
Gelatin — Bone Products
Ammonium Carbonate

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

33 FACTORIES AND SALES OFFICES, SERVING, U. S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

FEEDING THE Taproot OF SUCCESS...

Just as *quality* in the fertilizers you manufacture assures growth for the farmers' crops, just as surely does that reputation for *quality* assure growth for the manufacturers' business. For the very taproot of success in any business is the insistence upon quality in the goods produced.

There is no higher quality source of nitrogen for your Fertilizers than SMIROW TANKAGE. It is 100% natural organic. It is 90% water insoluble and 90% available. SMIROW TANKAGE is always in perfect mechanical condition . . . another mark of quality. It is uniform both in color and in texture.

To feed this taproot of the successful growth of your operation see that correct proportions of SMIROW TANKAGE assure outstanding quality in your goods.

To help make your sales grow, write for samples and prices.

SMIROW TANKAGE

MAKES PLANTS GROW

SMITH-[illegible]WLAND COMPANY

NORFOLK, VIRGINIA • CHEMICAL, ILLINOIS

aldrin

and

dieldrin

...control many insects
...protect dozens of crops

You make more sales!

aldrin

Aldrin's fast action against major crop pests protects farm production, and its economical usage has meant aldrin's widespread adoption for many crops.

COTTON INSECTS

From the very start, aldrin has been a top favorite for all-season cotton insect control. It is famous for weevil kill, gets most of the other major cotton pests as well, and combined with DDT it knocks out bollworm.

SOIL INSECTS

Aldrin has established an outstanding record of soil insect control. On potatoes, alone, countless bushels have been saved from destruction by wireworms, tuber flea beetle larvae and cutworms.

And aldrin controls many other pests that destroy plants beneath or near soil level.

rootworms in corn
white grubs in turf and many field crops
lawn chinch bugs in turf and lawns
green June beetle larvae and
European chafer grubs in lawns and turf
sugar beet maggots in beets
Japanese beetle larvae in lawns and turf
ants on crops and turf

GRASSHOPPERS

Ever since its first appearance, aldrin has been the international "hopper stopper." Whether halting the attacks of these voracious crop-eaters in North America or ending the famines caused by its cousin, the desert locust, in the Middle East, nothing approaches the incredible 99% control of just *ounces* of aldrin *per acre*.

dieldrin

Dieldrin leads the parade of those organic insecticides which have long residual action. And it controls a wide variety of insects. For that reason, dieldrin is a fine stock item to meet the needs of growers *the year round*. Here are a few examples of dieldrin's versatility:

COTTON INSECTS

Dieldrin first attracted national attention in cotton growing areas. You can rely on it to stop boll weevil, thrips, cutworms and plant bugs. For bollworm, use a dieldrin-DDT mix.

PUBLIC HEALTH PESTS

Many communities are enjoying greater comfort and increased property values through dieldrin's control of houseflies, mosquitoes, fleas and ticks.

TURF INSECTS

One of the fastest growing markets for insecticides is their application to lawns, golf courses and park areas. Dieldrin is outstanding in the control of ants, Japanese beetle larvae, white grubs and chinch bugs.

Both aldrin and dieldrin are easily made into dusts, wettable powders, emulsible concentrates, and granules—all common formulations. Your sales of these insecticides are backed by State and Federal recommendations, the finest of technical service, and a comprehensive advertising campaign. Sell them confidently!

SHELL CHEMICAL CORPORATION

AGRICULTURAL CHEMICALS DIVISION

P. O. BOX 1617, DENVER 1, COLORADO

Atlanta · Houston · Los Angeles · New York
San Francisco · St. Louis · Jackson, Miss. · Portland, Oregon

COMMERCIAL FERTILIZER

ESTABLISHED 1910

March, 1954

Volume 88 No. 3

ADVERTISING INDEX

Albemarle Paper Manufacturing Co., The 33
Allen Company 77
Allied Chemical & Dye Corp.
Nitrogen Division ..... Front Cover
American Agricultural
Chemical Co. ..... Inside Front Cover
American Limestone Co. .....
American Potash & Chemical Corp. 8
American Vermiculite Co., Inc. 77
Aquafil Company 16
Arkell & Smiths 34
Armour Fertilizer Works 43
Ashcraft-Wilkinson Co. 59,60
Atlanta Utility Works .....
Bagpak Division (International Paper Co.) ... 44
Baker & Bro., H. J. 36
Baughman Mfg. Company .....
Bemis Bro. Bag Co. 37
Berkshire Chemicals, Inc. 71
Blaw-Knox Co. (Blaw-Knox Equipment Div.) 53
Bradley Pulverizer Co. 77
Charlotte Tank Corp. 53
Chase Bag Co. .....
Chemical Construction Corp. 12
Chemical & Industrial Corp., The 41
Chemical Packaging Corp. .....
Cole Manufacturing Co. R. D. 64
Davison Chemical Corp. .....
Davidson-Kennedy Co. .....
DeBardeleben Coal Corp. 74
Dickerson Co., Inc. The .....
Dings Magnetic Separator Company .....
Phelps-Dodge Refining Corp. 39
Duval Sulphur & Potash Co. 59
Equitable Paper Bag Co., Inc. .....
Evans Metal Co. 68
Exact Weight Scale Co., The 13
Fertilizer Equipment Sales Corp. 9
Fulton Auto Exchange 77
Fulton Bag & Cotton Mills 55
General Industrial Development Corp. 56,57
Hammond Bag & Paper Co. .....
Harte Co., John J. 7
Highway Equipment Co. .....
Hough Co., The Frank G. 23
Hudson Pulp & Paper Corp. .....
Industrial Marking Equipment Co., The 74
International Minerals & Chemical Corp. 18
International Paper Co. (Bagpak Div.) 44
Johnson Company, C. S. .....
Koppers Co. (Tar Products Div.) 65
Kraft Bag Corporation .....
Law and Co., Inc. 77
Link-Belt Company 15
Lion Oil Company 45
McIver and Son, Alex M. 56
Marietta Concrete Corp., The 17
Monsanto Chemical Co., (Inorganic Div.) 69
National Lime & Stone Co. 76
Nitrogen Division (Allied Chemical & Dye Corp.) ..... Front Cover
Phillips Chemical Co. 14
Potash Co. of America ..... Inside Back Cover
Quaker Oats Co., The 71
Raymond Bag Co., The 11
Republic Steel Corporation .....
Sackett and Sons Co., The A. J. 50, 51
Sanitary District of Chicago, The 56
Shell Chemical Corporation 4,5
Shuey and Company, Inc. 77
Simplicity Engineering Co. .....
Smith-Rowland Co., Inc. 3
Southern Fert. & Chemical Co. 64
Southern Lead Burning Co. 43
Southern States Phos. and Fert. Co. 76
Southwest Potash Corp. 27
Spencer Chemical Co. .....
Stedman Foundry & Machine Co. 46
Sturtevant Mill Co. .....
Tennessee Corporation 54,63
Texas Gulf Sulphur Co. .....
Tull Metal & Supply Co., J. M. .....
Union Bag & Paper Corp. 31
Union Special Machine Co. ..... Back Cover
United States Potash Co., Inc. 49
United States Steel Corp.
(Subsidiary, Coal Chem. Sales Div.) 47
Universal Detergents, Inc. 66
Virginia-Carolina Chemical Corp. .....
Wiley and Company 77
Willingham-Little Stone Co. 68
Woodward & Dickerson, Inc. .....

Published Monthly by
WALTER W. BROWN PUBLISHING CO., INC.
75 Third St. N. W., Atlanta, Georgia Phone Atwood 4160

ERNEST H. ABERNETHY, *President*
BRUCE MORAN, *Editor* CLAY W. PENICK, *Managing Editor*
V. T. CRENSHAW, *Business Manager*

Subscription rates: United States, $3.00 per year; 5 years, $12.00. Foreign $5.00 per year.

In This Issue

Just Around the Corner, by *Vernon Mount* 10
It Seems to Me, by *Bruce Moran* 19
Industry Calendar 19
Midwest Soils Meeting 20
USDA Fertilizer Technology Report, by *K. D. Jacob* 29
Markets 42
Around the Map 48
Spencer Opens Vicksburg Plant 61
Personals 62
SAFETY
Gornto Outlines History 67
Annual Safety Contest Rules 72
PESTICIDES
NAC Spring Program Announced 73
Colorado Association Meets 73
Marietta Concrete Builds New Lab 75
Classified Advertising 77
Magnolia Suffers Tornado Damage 78

Address all correspondence to Atlanta Publishing Offices, sending direct to:
COMMERCIAL FERTILIZER, 75 Third St., N. W., Atlanta, Georgia.

Chicago Representative
ELON A. ABERNETHY
1323 S. Michigan Ave.—Room 400
Phone Harrison 7-0750

West Coast Representative
M. A. CALDWELL
2267 W. 24th St., Los Angeles, Cal.
Phone REPUBLIC 1-3050

COMMERCIAL FERTILIZER, entered as second class matter, October 12, 1910, at the post office at Atlanta, under the Act of March 3, 1879. Published monthly except semi-monthly in September, by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta, Georgia.

What do we know about your business?

When you have Fertilizer Plant needs

Extensive research and investigation of *all* the facts are necessary to make the building of a fertilizer plant economically sound. Many years of experience in the fertilizer industry have made Harte engineers cognizant of the over-all picture to be considered in fertilizer plant design. Realizing that certain fundamentals must be followed while specializing the design of each plant, all possible facts are studied and adapted to produce a sound, enduring investment.

If you plan to build a fertilizer mixing plant, or an associated plant, the Harte organization of specialists can handle your complete job or any part, from original design to operating plant. Under the Harte System all steps — site study, planning, architectural, engineering, purchasing, construction management — are integrated, assuring smooth-working continuity. Assuring a saving in time and money. In fertilizer plant planning there's no substitute for experience. Call in the Harte organization for a discussion of your plans. There's no obligation.

JOHN J. HARTE COMPANY | ENGINEERS CONSTRUCTION MANAGERS

SPECIALISTS IN THE FOLLOWING PROCESSES: • Solvent Extraction Systems • Sulphuric Acid • Vitamin Recovery • Synthetic Detergents • Insecticide Plants • Clay Processing • [redacted] • Paper Mills • Electrolytic De-Tinning • Lime and Cement • Rubber Products • Glass • Explosives • Petrochemicals • Food Canning Plants • Cotton Mills • Industrial Warehousing • Steam Generating & Power Plants • Milk By-Products • Naphthalene & Tar Plants

284 TECHWOOD DRIVE, N. W., ATLANTA • NEW YORK • HOUSTON • MEXICO, D. F. • HAVANA • WASHINGTON, D. C.

Only the BAGS are NEW

THE QUALITY... *as uniform and dependable as ever!*

It's news when a brand you've specified for years comes to you in new and modern containers. That's why we say—"meet an old friend with a New Look!" On the other hand, it's not news but a long established fact that Three Elephant* and Trona† brand chemicals—by bag or carload, for farm or factory—are your guarantee of uniform high quality and economical production. So assure yourself of quality that's "in-the-bag" with dependable products from Trona—supplier of basic chemicals indispensable to Industry and Agriculture the world over.

TRONA
INDUSTRIAL AND AGRICULTURAL CHEMICALS
ESTON CHEMICALS

American Potash & Chemical Corporation

Offices • 3030 West Sixth Street, Los Angeles 54, California; 122 East 42nd Street, New York 17, N. Y.
• ESTON CHEMICALS DIVISION—3100 East 26th Street, Los Angeles 23, California
Plants • Trona and Los Angeles, California

*Trade Mark Registered
†Trade Mark AP&CC

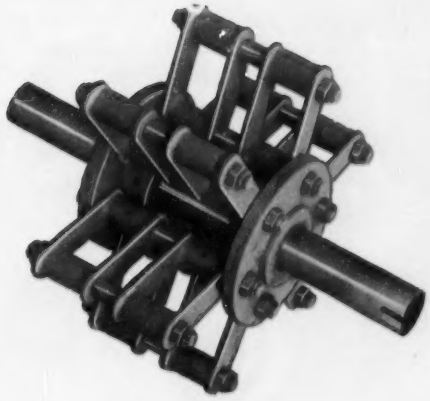
• BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM & BROMINE CHEMICALS
and a diversified line of specialized AGRICULTURAL, REFRIGERANT and INDUSTRIAL CHEMICALS

TAILINGS PULVERIZER

EFFECTIVE

COMPACT

ACCESSIBLE



RUGGED

FERTILIZER EQUIPMENT SALES CORPORATION
130 KROG ST., N.W. ATLANTA, GEORGIA — CH. 6615

JUST AROUND THE CORNER

By Vernon Mount

GROSS NATIONAL PRODUCT, or GNP, as the economists love to call it was only a little less than what the Government now spends in the easy memory of the current generation. And most of what is being spent is for Defense.

WE'RE IN NO WAR, but we are responsible for one, and sitting on the edge of our chair about several additional. We have committments that make us respond if shooting starts all around the World...or should I say, all around the USSR? Nearly three quarters of a billion people, not US citizens, look expectantly our way whenever the thunder rumbles in their direction...39 nations; six continents.

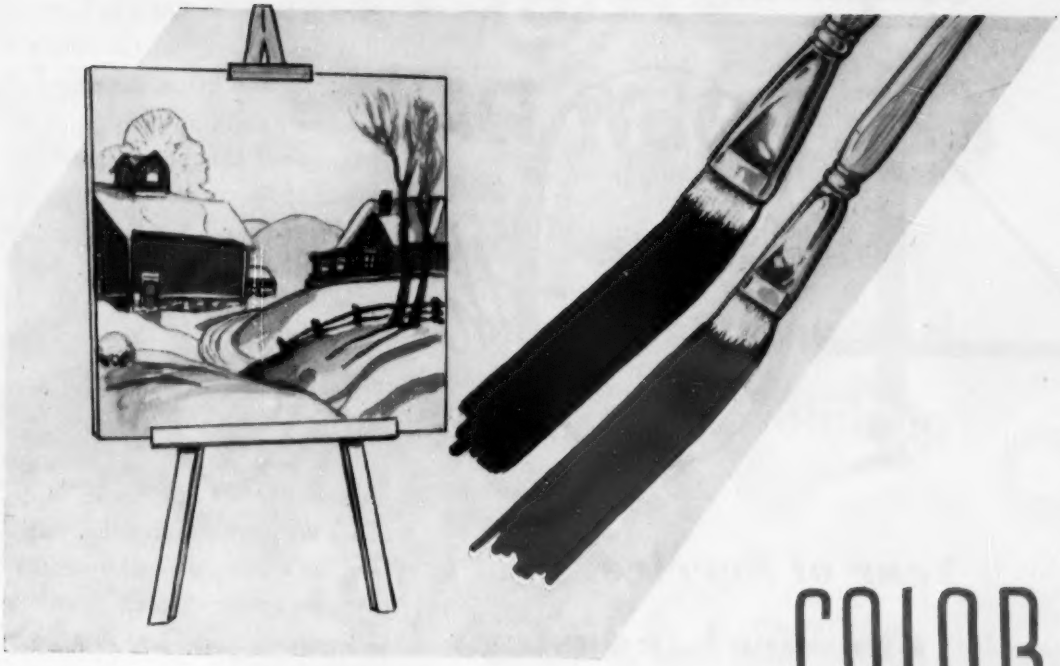
WE HAVE TO BE READY for all of that, or any part of it--to slide down the pole, don our fireman's hat and go clanging off to put out the conflagration before it develops into a holocaust. And such preparedness calls for spending money. And spending money means payrolls back through the finished goods to the raw materials. And so it means money in the pockets of everybody--Capital, Labor, Agriculture.

HOW CAN DEPRESSION hit a nation spending money like that, with more than 60,000,000 working--and the unemployed figure a long, long way from what used to be considered "normal"--even on the basis of the new data that picks up even temporarily unemployed persons, never before tabulated?

WE'LL GET ALONG. Just remember most of the economists are on somebody's payroll, and biased accordingly!

Yours faithfully,

Vernon Mount



COLOR

Colors as bright and attractive as an artist's palette are used in the printing of RAYMOND MULTI-WALL PAPER SHIPPING SACKS.

Increase your sales and profits this year!

Pack and ship your fertilizer in Raymond Shipping Sacks. They'll cut your packing costs. They'll reduce material loss all the way from the packer to the user.

Raymond Multi-Wall Paper Shipping Sacks are available in various types, sizes, and strengths. Printed or plain. They are CUSTOM BUILT to order.

THE RAYMOND BAG COMPANY
Middletown, Ohio

RAYMOND
Multi-Wall
PAPER SHIPPING SACKS

Completing Our

40th

Year of Service to the Chemical Industry

Generally, there's not much point in telling people how long you've been in business. But it so happens that the 40 years of Chemico's existence also marks the period of greatest growth of this country's huge chemical industry. Chemico is proud of its part in the development of this industry . . . a development that required more than a little pioneering courage.

They say that "Life begins at 40" because that age combines seasoned judgment with youthful vigor. At this 40th Anniversary Chemico certainly offers experience, initiative and the assurance that you can, as always, depend upon the promise in our slogan:

"Chemico plants are profitable investments"

CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

488 MADISON AVENUE, NEW YORK 22, N. Y.

CABLES: CHEMICONST, NEW YORK

TECHNICAL REPRESENTATIVES: CYANAMID PRODUCTS LTD., LONDON • CHEMICAL CONSTRUCTION (INTER-AMERICAN) LTD., TORONTO • SOUTH AFRICAN CYANAMID (PTY) LTD., JOHANNESBURG

CHEMICO CHEMICAL CONSTRUCTION CORP.

CC-860

EXACT WEIGHT Scales

for fast, accurate manual sacking and checkweighing

EXACT WEIGHT Scales speed production two ways. Short lever fall and the action of an adjustable damping mechanism bring the indicator to rest quickly. Magnified visible indication makes possible an accurate reading at a glance. These features trim seconds off each weighing operation. Note how the end-tower design permits a free flow of work over the scale, with clear visibility of the indicator. Model shown has sack rest and is available in 25- and 50-pound capacities, with choice of end-reading or side-reading dial. Send coupon for complete details.

Exact Weight Scales

Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

906 W. Fifth Avenue, Columbus 8, Ohio
2920 Bloor St. W., Toronto 18, Canada

Sales and service in all principal cities from coast to coast and Canada.

EXACT WEIGHT SCALE CO., Columbus 8, Ohio

Send complete information on Model 944.

Name .....

Address .....

City ..... Zone ..... State .....

Phillips supplies NITROGEN in 4 forms

1 AMMONIUM SULFATE

Phillips *66* Ammonium Sulfate is available *now!* It's *dry*-cured to remove excess moisture—prevent caking. Uniform crystals flow freely—mix easily. Contains 21% nitrogen, ideal for all analyses of mixed goods and for direct application to all farm crops. Contact us now for your requirements.

2 ANHYDROUS AMMONIA

Tank car shipments of Anhydrous Ammonia (82% nitrogen) are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle. Write our nearest district office for full information.

3 NITROGEN SOLUTIONS

Get more N per dollar! Phillips *66* Nitrogen Solutions are well suited to the preparation of high-analysis fertilizers and the ammoniation of superphosphate. These three nitrogen solutions keep handling costs low! Promote rapid, thorough curing!

4 AMMONIUM NITRATE

Phillips *66* Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for uniform, free-flowing properties and top-notch crop response.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company

FERTILIZER SALES DIVISION · BARTLESVILLE, OKLAHOMA

DISTRICT SALES OFFICES:

NORFOLK, VA.—610 Royster Bldg. • TAMPA, FLA.—7 Terrace Office Bldg.

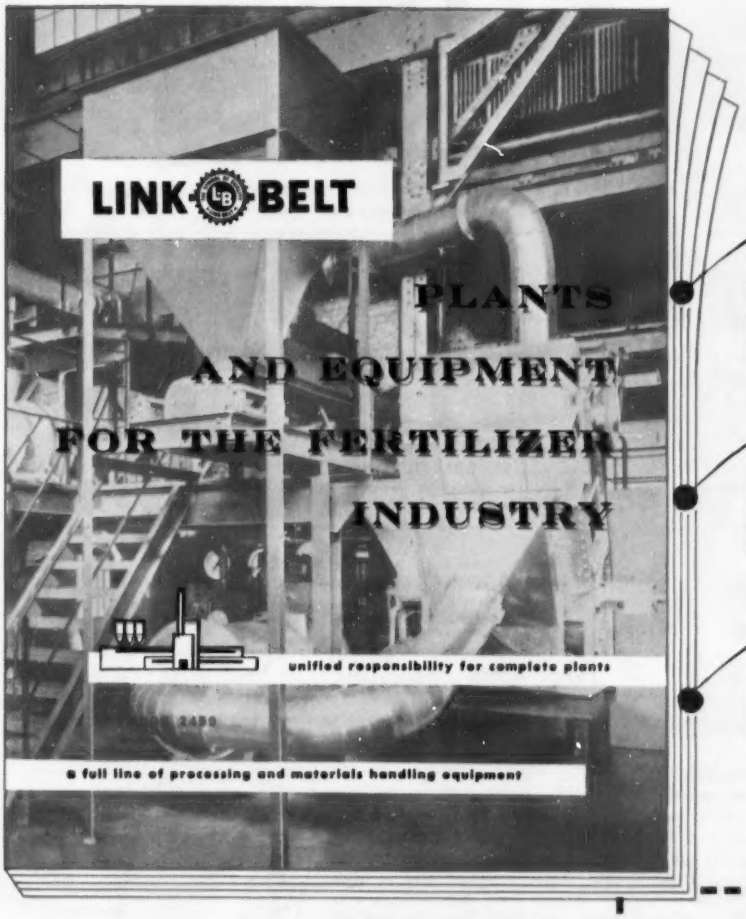
HOUSTON, TEX.—1020 E. Holcombe Blvd. • AMARILLO, TEX.—First National Bank Bldg. • OMAHA, NEB.—WOW Bldg.

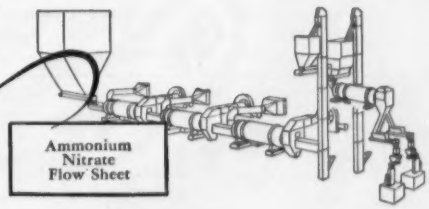
PASADENA, CALIF.—604 Citizens Bank Bldg. • NEW YORK, N. Y.—80 Broadway • BARTLESVILLE, OKLA.—Adams Bldg.

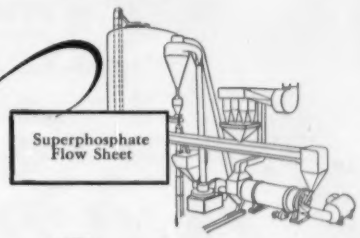
Get this new book on modern fertilizer plants and equipment

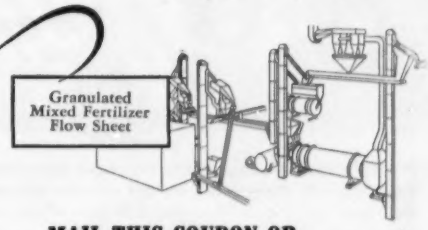
Read about the latest in processing and handling equipment plus LINK-BELT's unique "turn-key" service

IN step with the fast-moving commercial fertilizer industry, Link-Belt has compiled a 16-page book on plant developments (illustrated by flow sheets) and processing and handling equipment. This book also details Link-Belt's unified responsibility for the design, equipment and erection of complete plants.









MAIL THIS COUPON OR WRITE TODAY

LINK-BELT COMPANY
300 West Pershing Road, Chicago 9, Illinois
(or your nearest Link-Belt office)

Please send me a copy of your new Fertilizer Plant and Equipment Book 2459.

Name .....

Position .....

Firm .....

Address .....

City ..... Zn.... State.....

LINK-BELT

CONVEYING AND PROCESSING EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13.375

AQUAFIL! *Offers You...*

✓ BIGGEST SUPPLY ✓ BEST QUALITY
✓ LOWEST PRICE . . .

CONDITIONING AGENT FOR COMMERCIAL FERTILIZER—Aquafil is the product stabilizer that ends caking in the bag.

DILUENT FOR INSECTICIDES—With Aquafil you get high concentration which means savings.

COVERING AGENT FOR AMMONIUM NITRATE—High absorption qualities make Aquafil an effective agent.

RESIDUAL FILTERING AGENT IN PAPER INDUSTRY—Impurities rapidly filtered out by Aquafil's action.

INERT FILLER FOR INSULATION INDUSTRY—Aquafil offers stable, uniform filler for industry needs.

AQUAFIL PROPERTIES

Density: 9.6 pounds per cubic foot.

Fineness: 95.3% through 325 mesh.

Composition: Aquafil is amorphous diatomaceous silica.

Inertness: Used by many industries as inert filler.

Suspension: Excellent in water and air.

• More and more users of diatomaceous earth are turning to Aquafil . . . and finding it profitable. Aquafil offers you a high quality product, from North America's largest level deposit . . . and at less cost. It will pay you, too, when you look into the use of Aquafil as a means of improving your product, as it increases your profit margin. Next time you order diatomaceous earth . . .

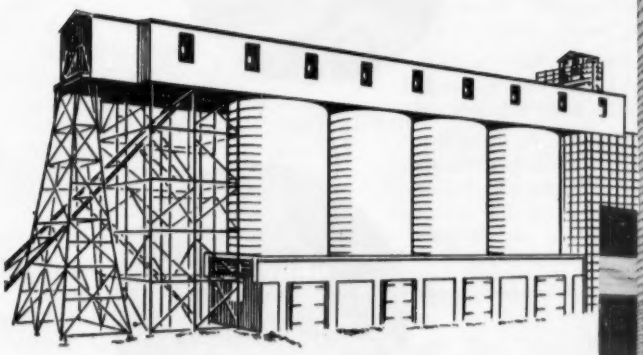
Specify AQUAFIL!

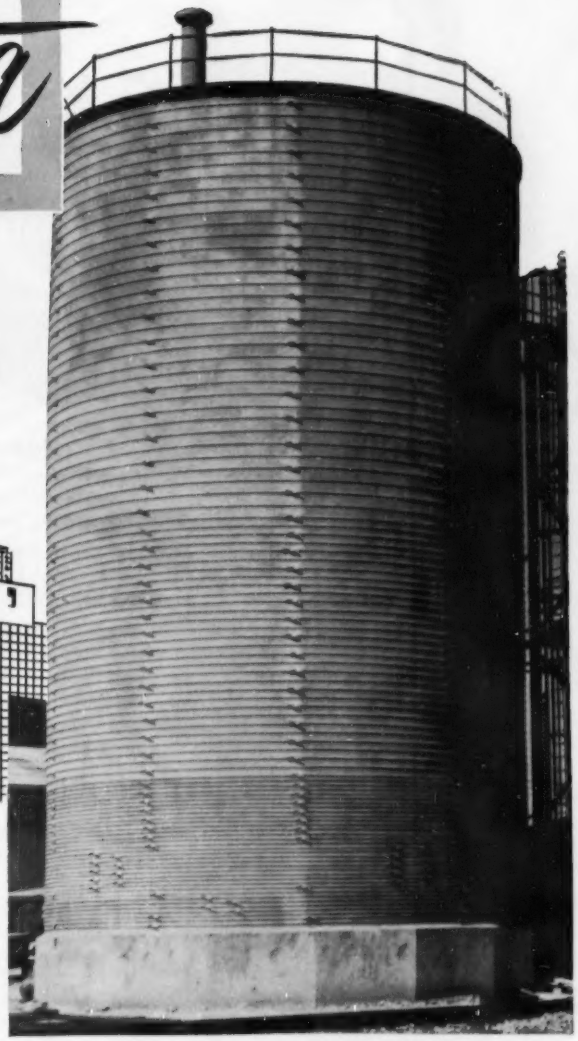
AQUAFIL COMPANY **96 B Avenue N.E.** **Cedar Rapids, Iowa**

Marietta

GREATEST NAME IN SILOS

lets you think in YEARS-AHEAD terms!





From foundation to roof, a Marietta Concrete Storage System is adaptable to every type of materials-handling.

Marietta engineers, thinking in years-ahead terms, have long recognized the unpredictability of the future as an important factor permanently tied to the apron strings of industry. Constructive thinking, in the past, with particular attention to this factor, has resulted in the production of modern storage systems purposely designed for immediate conversion or expansion without imposing penalties to meet any need.

There is no limit to the equipment that can be incorporated into a Marietta silo wall, roof or floor. A flexible Marietta Silo will accommodate any discharge system.

Concrete silos erected during 1916, the year Marietta ventured into the industrial storage system business, are in useful operation today, standing as undeniable tributes to the wisdom, integrity and engineering prowess which have always been fundamental characteristics of The Marietta Concrete Corporation.

Whatever you store or handle, you'll be money ahead with a complete Marietta Concrete Storage System. Write today for particulars. Catalog upon request.

THE Marietta CONCRETE CORPORATION

MARIETTA, OHIO

BRANCH OFFICES

501 Fifth Ave., New York 17, N. Y.
Hollywood, Florida
Pulaski Hwy. at Race Rd., Baltimore 21, Md.
805 Bessemer Bldg., Pittsburgh 22, Pa.
Box 1575, Charlotte, N. C.

PRECAST CONCRETE PRODUCTS FOR FARM, HOME AND INDUSTRY

phosphate

For the manufacture of complete fertilizers.

phosphate

For the manufacture of industrial chemicals.

phosphate

Ground rock phosphate for direct application to the soil.

phosphate

Defluorinated phosphates for feed and mineral manufacturers.

International phosphates for industry and agriculture

Phosphate Mines and Plants in Florida at Noralyn, Bonnie, Peace Valley, Achan, Mulberry; in Tennessee at Mt. Pleasant and Wales; in Mississippi at Tupelo.

phosphate division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

3rd Annual National Land Judging Contest

All roads will lead to Oklahoma City in April as the National Land Judging contest goes into its third year with special sections of land appreciation schools and a new method of teaching pasture and range management as added inducement to entries. Dates for this year's contest are April 29-30, with April 19 set as the entry deadline. Entries should be sent to Edd Roberts, Extension soil conservationist, Oklahoma A. & M. College, Stillwater, Okla.

The contest, sponsored by stations WKY and WKY-TV in Oklahoma City in cooperation with state farm agencies, has a history of being the first land judging meet to draw entires from the entire nation. Begun in 1952, the contest has steadily grown until entries numbering 2,000 are expected this year.

Land judging as a method of teaching soil conservation and improvement has spread to approximately 30 states since its beginning in Oklahoma.

California Second Conference In Visalia April 29-30

The Second Annual California Fertilizer Conference will be held in the main conference room of the Moose Hall, Visalia, on Thursday and Friday, April 29 and 30. The program is being developed by the Tulare and Kings County Directors of the University of California Agricultural Extension Service and the Soil Improvement Committee of the California Fertilizer Association. Farmers, fertilizer manufacturers, dealers and salesmen, official technicians of the University and the U.S.D.A., western states fertilizer control authorities, and all others interested are urged to attend.

The morning of Thursday, April 29, will be devoted to results to date of fertilizer experiments on local crops in the two counties. There will be a field tour in the afternoon during which the featured test plots and alkali reclamation work will be inspected.

The entire day of April 30 will be devoted to a program sponsored by the Soil Improvement Committee of the California Fertilizer Association. The theme will be "Phosphate." A panel discussion will be featured of problems of phosphorus fertilization of California crops, including vegetables, field crops, deciduous tree crops and citrus crops. Problems concerning fertilizer law enforcement and of assuring proper supply and distribution of phosphate fertilizers will be outlined.

An outstanding authority on soil and plant nutrition will be the featured speaker, following a banquet at Moose Hall on the evening of April 29. Copies of the printed program will be available when they have been prepared, upon application to the office of the California Fertilizer Association, 475 Huntington Drive, San Marino 9, California.

It Seems to Me

by BRUCE MORAN

My text for today is a joke in the Chilean Nitrate Farm Forum: "A youngster we know was trying to explain to his father the reasons for his poor grades on the report card he had just brought home from school. 'Don't forget, dad' he said, 'we're studying all new stuff this year.' "

That is the situation in which our entire industry finds itself.

Technically we have made tremendous strides in the past ten years or so. But from a sales standpoint we have made little or no progress. This may seem a strange statement in an industry whose production has doubled in that decade . . . but a little reflection will cause you to agree with the statement.

This year we are studying all new stuff . . . a market that needs what we have in order to make a profit, but dragging its feet because there has been a drop in farm income.

We must meet that "new stuff" with intelligence, perserverance and full use of all the modern mechanisms of selling which are applied so well in other fields. We have only to look about us, to see what can be done under tough, competitive conditions . . . and apply some of those ideas to our own selling and advertising it seems to me.

INDUSTRY CALENDAR

Date	Organization	Place	City	State
March 7-9	Sou Safety	Brown Hotel	Louisville	Ky.
March 24-26	NAC	Shamrock	Houston	Texas
May 4-6	N. C. Safety	_____	Raleigh	N. C.
May 6-18	Md. Safety	_____	Baltimore	Md.
May 20-23	Va. Safety	_____	Norfolk	Va.
June 10-12	APFC	Homestead	Hot Springs	Va.
June 14-16	NFA	Greenbrier	White Sulphur	W. Va.
July 20-22	Pacific Conference	Klawath Falls AES		Oregon
Nov. 10-12	NFA	Hollywood Beach Hotel	Hollywood	Fla.
Nov. 15-16	CFA	del Coronado Hotel	Coronado	Cal.
Dec. 2-3	Cotton Insect	Adolphus	Dallas	Texas

Midwest Soils CHICAGO CONFERENCE

BEST ATTENDED IN THE HISTORY OF THEIR MEETINGS

How soil tests can be used to help farmers produce higher per-acre crop yields through more efficient fertilizer use, was described in research reports presented at the annual joint meeting of Midwestern college agronomists with representatives of the fertilizer industry, at the Palmer House, Chicago, February 19.

KEY TO PICTURES

1. F. W. Smith, Kansas State College. 2. Harold Douthit, International Minerals & Chemical Corp., Jim Schell, Kingsbury & Co. 3. George D. Scarseth, American Farm Research Bureau, Vincent Sauchelli, The Davison Chemical Corp. 4. Charles F. Martin, Miami Fertilizer Co., B. P. Redman, Farmers Fertilizer Co. 5. George Kingsbury, Jr., and George Kingsbury, Sr., Kingsbury & Co. 6. W. A. Seay, University of Kentucky, Paul Burson, University of Minnesota, and A. J. Ohlrogge, Purdue University, making transcription with Norman Kraeft, Radio Farm Director of Station W-G-N, Chicago, for later broadcast. 7. G. A. Barclay, Middle West Soil Improvement Committee, Arthur Mullin, Indiana Farm Bureau Coop. Ass'n. 8. Harold Vorhes, Virginia-Carolina Chem. Corp., R. G. Fitzgerald, Smith-Douglass Co., Inc., W. M. Newman, Price Chemical Co., Ray Pavlak, Wisconsin FarmCo Service Coop. 9. Albert Woods, Potash Co. of America, L. A. Krebs, Baugh & Sons Co., C. E. Littlejohn, U. S. Potash Co. 10. J. P. Long, U. S. Steel Corp., S. J. Martenet, E. Rauh & Sons Fert. Co., Leon Baker, Snyder Chemical Co., R. E. Bennett, Farm Fertilizers, Inc. 11. K. C. Berger, University of Wisconsin, Dan Williams, Minnesota Farm Bureau Service Co., Floyd W. Smith, Kansas State College.

Best-attended in the history of these meetings, the program drew nearly 500 to the hotel's Red Lacquer room. These included personnel from more than 100 companies and organizations, plus 13 state colleges and agricultural experiment stations.

Dr. Floyd W. Smith, Kansas State College, was chairman. Research reports were presented by: G. E. Smith, University of Missouri; John Hanway, Iowa State College; K. C. Berger, University of Wisconsin; Paul M. Burson, University of Minnesota; E. H. Tyner, University of Illinois; and H. E. Myers, Kansas State College. P. T. Truitt, president of the American Plant Food Council, spoke for the fertilizer industry.

Among soils men attending the meeting and participating in the discussions were: University of Illinois, John Gieseking, A. L. Lang, S. W. Malsted, M. B. Russell and F. C. Bauer; Indiana (Purdue University), A. J. Ohlrogge, J. B. Peterson, and C. J. Overdahl; Iowa State College, G. M. Browning, W. H. Pierre, George Stanford, Elwin Duncan, John Hanway, Don Kirkham and Charles Black; Kansas State College, F. W. Smith, J. A. Hobbs, R. V. Olson, F. G. Bieberly and H. E. Myers; University of Kentucky, W. A. Seay; Michigan State College, A. E. Erickson, Kirk Lawton, E. D. Longnecker, L. S. Robertson; R. L. Cook and Max Mortland; University of Minnesota, A. C. Caldwell, J. M. MacGregor, P. M. Burson, H. E. Jones and C. O. Rost; University of Missouri, G. E. Smith, E. R. Graham, John Falloon; University of Nebraska, M. D. Weldon, T. M. McCalla, R. L. Fox, R. A. Olson, A. P. Mazurak and H. F. Rhoades; University of North Dakota, V. A. Weiser, E. B. Norum and J. C. Zubriski; Ohio State University, G. W. Volk, W. P. Martin, G. S. Taylor, H. J. Mederski and J. L. Haynes; South Dakota, W. W. Worzella, L. F. Buhr, B. Brage and L. Ludd; University of Wisconsin, C. J. Chapman, Orville Hays, O. J. Attoe, K. C. Berger.

H. S. Vorhes, president of the Middle West Soil Improvement Committee, welcomed the agronomists. He cited the benefits resulting to both the soils men and the fertilizer industry from these meetings. Fertilizer men, he said, get firsthand information on the latest college research. Agronomists from each of the states exchange ideas and discuss plans for cooperation in regional research. Both fertilizer industry and soils men develop a closer understanding of the problems affecting each, and can work cooperatively in helping promote better soils management and more efficient crop production by farmers.

George E. Smith, University of Missouri, opened the program with a discussion of "Fundamental Principles Involved in Soil Testing."

"Early experiments with fertilizer in the Middle West," said Smith, "were designed to determine the minimum amount of fertilizer needed to give profitable yield increases. Recent experiments have shown that, when sufficient plant nutrients are added, low-fertility soils can be be made to produce top yields."

Smith said that soil tests can now show the nutrient reserves in individual soils, and help in calculating the kinds and amounts of nutrients needed to build the soils to high crop production. These tests, he said, are not perfect, but if good soils samples are properly analyzed, they can give information that helps develop an efficient fertilization program.

Chairman F. W. Smith, Kansas State College, presiding over meeting, with panel of speakers called upon to answer questions: K. C. Berger, University of Wisconsin, G. E. Smith, University of Missouri, E. H. Tyner, University of Illinois, Paul Burson, University of Minnesota and H. E. Myers, Kansas State College.

The increased use of chemical nitrogen and higher crop yields in the past years, have increased the need for other essential elements, Smith said.

"The weakest link in soil testing," he said, "is failure to obtain representative soil samples. Laboratory procedures are generally more accurate than are sampling methods.

"There is little benefit in improving and refining laboratory methods unless soil sampling errors are reduced."

John Hanway, Iowa State College, reported on "Correlating Soil Test Information with Crop Response."

First step in an adequate correlation of soil tests and crop response for different soils and different crops, he said, is evaluating the soil test on the soils to be tested.

Discussing research experience in Iowa, Hanway said that greenhouse experiments should be made, including representative samples of soils tested. Field fertilizer experiments should also be conducted to obtain response data on soils tested and crops for which fertilizer recommendations are made. There should be a sufficient number of field experiments to cover the range of soil test values, he said. Experiments should be conducted over a period of years, applying different rates of the nutrients needed. Other fertilizer nutrients should be supplied in adequate amounts.

If only surface soils are to be tested, Hanway said, the nutrient availability in subsoils must also be evaluated. Other factors which might influence crop response from fertilizer and yet not influence soil test results, he said, are the soil's physical condition, drainage, ph (neutral, acid or alkali) minerals in the soil, and organic matter content. Soil test results, too, he said, should be correlated with the yield increase obtained from different rates of fertilizer application on each group of soils for each crop.

K. C. Berger, University of Wisconsin, reported that fertilizer prescriptions based on soil tests are helping many Wisconsin farmers grow 100-bushel corn yields.

Berger pointed out that a 100-bushel corn yield needs 150 pounds of nitrogen, 60 pounds of phosphate, and 120 pounds of potash during the growing season. A soil test can indicate how big an amount of these nutrients the soil itself can make available to the crop. On the basis of the soil test, a fertilizer prescription can be written to provide the additional nutrients needed to produce a 100-bushel yield on a particular soil. The amounts of the nutrients depends on whether or not manure is applied.

In 1952, he said, corn yields on 173 fields on 162 farms in 10 southern Wisconsin counties, averaged 124 bushels per acre, when fertilizer prescriptions were written for individual fields, based on soil tests. The soils men recommended that corn be drilled or hill dropped so as to have 17,000 to 20,000 plants per acre. The prescription also called for shallow cultivation, with only one or two cultivations to avoid root pruning.

Yields averaged 155 bushels on six fields. On 103 fields, yields ranged from 120 to 150 bushels, and on 49 other fields, from 100 to 120 bushels. Only 15 fields recorded yields under 100 bushels, with the average on these amounting to 92 bushels.

Berger said that in 1953, prescriptions for 100 bushel corn yields were written for about 1,500 fields in 39 counties, including the northern part of the state, where the growing season is somewhat shorter. The 1953 growing season in Wisconsin was not as favorable as in the previous year, he said. Corn yields averaged 102.2 bushels on 765 fields. Eight fields averaged 159.8 bushels per acre. Yields on 114 field ranged from 120 to 150 bushels. On 294 fields, yields ranged from 100 to 120 bushels. On 332 fields, the yields were under the 100-bushel mark, averaging 88.5 bushels. Here the stalk population averaged 13,900 per acre.

Applications of as much as 1,425 pounds per acre of fertilizer carrying nitrogen, phosphate and potash, were recommended in some prescriptions, depending on nutrient levels of soils, and whether or not manure was applied. The treatment included broadcasting, drilling fertilizing in the row, and sidedressing nitrogen fertilizer.

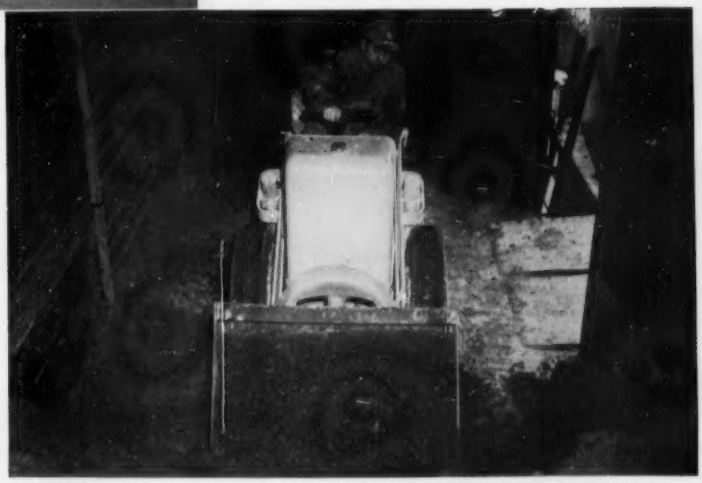
Berger reported that farmers like the fertilizer prescriptions and follow them more closely than would be the case with a more generalized fertilizer recommendation. They are interested specifically in their own field, and the results show that this method of recommendation is successful, he said.

Paul M. Burson, University of Minnesota, reported that Minnesota was the first state to have the fertilizer industry and the local fertilizer, feed and seed dealers, elevators and creameries serve as soil sample collection depots throughout the various counties for the state soil testing laboratory.

"Through the fertilizer industry," said Burson, "the dealers were asked to assist the county agent, as local leaders, by operating soil sample collection agencies. The county agent provides the cooperating dealers with instruction forms, information sheets, soil sample containers and shipping containers for the use of

IN BINS

or BOXCARS



PAYLOADERS Blast Bulk Handling Costs

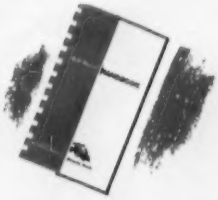
Scoop-up? Carry? Dump? Spread? Load? Pile? Pour? . . . "PAYLOADER" tractor-shovels will do all of these bulk material handling jobs for you and many more . . . up to three tons at a time . . . travel at speeds up to 28 miles per hour . . . work inside buildings or outside on pavement or ground.

"PAYLOADERS" bring a combination of speed, low cost, flexibility and versatility to your bulk-handling problems unmatched by any other type of equipment. Thousands of "PAYLOADER" installations in all kinds of plants and situations have accomplished tremendous cost reductions through savings in time and labor and through increased production.

Our broad experience, plus that of your Hough Distributor, is available to help solve your bulk material handling problems, and without obligation. The Frank G. Hough Co., 702 Sunnyside Ave., Libertyville, Ill.

FREE HANDBOOK

Tells how and where to look for signs of inefficient bulk materials handling . . . how to analyze, organize and set up an efficient handling system. Plus many useful tables and data. Write for "Bulk Materials Handbook."



SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. SINCE 1920

farmers. The farmer can either send his own samples to the laboratory, or take them back to the dealer depot, where the dealer will send them in to the state laboratory for testing.

"The tests made on each sample of soil include: ph, available potash, available phosphate, indication of organic matter level, and general textural differences.

"From the tests and information given by the farmer on the information sheet, and along with the years of research on how fertilizers function in the soil and the nutrient requirements of different crops, recommendations are given for liming if necessary, fertilization as to grades and rates per acre, and other soil management practices as may be necessary.

"When the soil test reports and recommendations are received by the farmer, he takes them to his fertilizer dealer, and the two of them determine the amount of fertilizer need for the different crops throughout the season.

"In Minnesota, the fertilizer grades as furnished by the industry are grouped into ratios on a form sheet. When a recommendation is given a farmer, he is advised the amount to apply per acre for each grade in the ratio. In this way there is no discrimination between fertilizer grades in the same ratio.

"However, if a grade is lower in the amount of plant food it contains, more will have to be applied per acre than if one of a higher analysis was used. By this method the farmer can purchase the grades he needs from his regular and favored dealer that he has been doing business with for many years before.

"To help the fertilizer dealer in this program, the county agent and the Extension Soils Specialist hold fertilizer dealer meetings to bring to the dealers the latest information on soils, fertilizer and testing. This helps the dealer become a better leader in his community. He can help farmers because the dealer, in most cases, is the last man the farmer sees before he goes into the field in the spring."

Burson said that while all soil tests are made at the University of Minnesota farm at St. Paul, in 17 counties the county agent or assistant county agent in soil conservation make the recommendations in their own county. These agents from the 17 counties were all brought to the University farm for a three-day training school on soil testing, so they could make the recommendations. This step was taken in order to spread the load of reviewing tests, and making recommendations because of the steadily increasing number of samples being sent to the state laboratory.

In a report entitled "Principles Involved in Selecting Time for Application of Fertilizer," Edward H. Tyner, University of Illinois, pointed out that in crop production there is competition between the roots of the plant and the soil itself. This competition, he said, comes mainly from two sources: 1—The colloidal phase; 2—The soil's population of microbes or organisms.

In the colloidal phase, a literal "hide-and-seek" game exists in the soil between the root system of a crop and any plant food, such as phosphorus and potash, which, through chemical reactions, is attached in relatively insoluble form on soil colloidal surfaces.

The problem in fertilization, he said, becomes one of building up the available phosphate and potash supply of a soil to the point where no matter where the root goes, there is always a sufficient supply of nutrients. Or it involves placing these nutrients in bands with a minimum of soil contact in a position where plant roots quickly find the applied phosphorus and potash.

Tyner said that active competition for available nitrogen may occur between a growing crop and the soil's microbial population, when crop residues such as straw, sod-bound grass sods, etc. are plowed down. In this case the placement of nitrogen is of less importance than is the matter of the amount of nitrogen applied, and the time of application. Generally, he said, about 30 pounds per acre of actual nitrogen is sufficient to satisfy the needs of soils organisms in rotting organic matter.

Growing plants, he said, usually demand the greater proportion of their nitrogen just before and just after the reproductive stage. Nitrogen, therefore, should be either plowed under or side-dressed early to assure its being in the root zone at the critical reproductive period.

Paul T. Truitt, president of the American Plant Food Council, in a report on "Fertilizer Production Facilities," said that the agronomists and the fertilizer industry have at least one problem in common: How to get the state experiment fertilizer recommendations fully and uniformly used by all farmers.

KEY TO PICTURES

1. Russell Coleman, National Fertilizer Assn., H. E. Myers, Kansas State College, P. T. Truitt, American Plant Food Council. 2. W. A. Webster, Quaker Oats Co., W. M. Newman, Price Chemical Co. 3. S. R. White, Spencer Chemical Co., A. C. Norris, V. W. Norris & Son Co. 4. R. L. Cook, Michigan State College, Z. H. Beers, Middle West Soil Improvement Committee, A. J. Ohlrogge, Purdue University. 5. G. O. Powell, F. S. Royster Guano Co., J. E. Evans, Smith-Douglass Co., Inc., Dennis Hatherly, F. S. Royster Guano Co., W. B. Copeland, Smith-Douglass Co., Inc., M. V. Ray, F. S. Royster Guano Co., G. T. Newnam, Smith-Douglass Co., Inc. 6. Phil Stocker, and Chet Johnson, both of Land O' Lakes Creameries, Inc., Vincent Sauchelli, The Davison Chemical Corp., W. H. Pierre, Iowa State College. 7. Dan Williams, Minnesota Farm Bureau Service Co., G. N. Hoffer, American Potash Institute. 8. C. J. Cahill, Rath Packing Co., Dean R. Gidney, Paul R. Soule, Grand River Chemical Division, Deere & Co., Frank Nelson, Rath Packing Co. 9. John F. Reed, F. W. Reed and Charles V. Carman, all of Kova Fertilizer, Inc. 10. C. A. Duncan, Iowa State College, John Falloon, University of Missouri, Paul Burson, University of Minnesota, John R. Taylor, Grand River Chem. Div., Deere & Co. 11. Z. H. Beers, Middle West Soil Improvement Committee, N. T. White, Smith Agricultural Chemical Co., W. P. Martin, Ohio State University. 12. H. L. Garrard, American Potash Institute, Robert L. Stern, Alfred D. Little, Inc., Dallas Cantwell, Spencer Chemical Co. 13. W. B. Copeland, Smith-Douglass Co., Inc. F. C. Bauer, University of Illinois. 14. Tracy Adcock, Swift & Co., C. R. Martin, Miami Fertilizer Co., A. F. Miller, Swift & Co. 15. Gene Van Deren, Blue Grass Plant Foods, Inc., R. S. Rydell, Swift & Co.

"Already the agronomists have recommended, by and large, about twice the amount of fertilizers we have seen used in any one year," Truitt said. "Already the industry has reached a new high for 14 consecutive years, and in the 1954 crop year is prepared to produce about 11 per cent greater tonnage of plant food than was used last year.

"Just now," he added, "because our industry has expanded production — because more fertilizer is available than has ever been used before—and because the fall half of the present crop year has been somewhat slack—I suggest that agronomists, as well as industry people, do their utmost to carry the advantage of sound fertilizer use practices to each and every farmer in the nation.

"I suggest—even urge—such action, not in the interest of increasing food and fiber surpluses, but in the interest of more efficient farming. Not all citizens realize that, despite temporary surpluses in some foods, we must increase the total output of food each year over the preceding year if we are to eat as well in the future as we now do.

"A process of expansion through readjustments in acres and crops is now under way, and is likely to continue for some time. In the future, I think we shall see an increasing use of fertilizers and lime, and a growing but diversified output of food and fiber."

Summing up the immediate future outlook, Truitt said that for the present the rate of maturity of fertilizer plant expansion programs is satisfactory, and "in fact, for all practical purposes, can be considered as completed."

Increased supplies available to farmers this crop year, Truitt said, are expected to be about 11% more nitrogen, 12% more phosphate, and about 15% more potash.

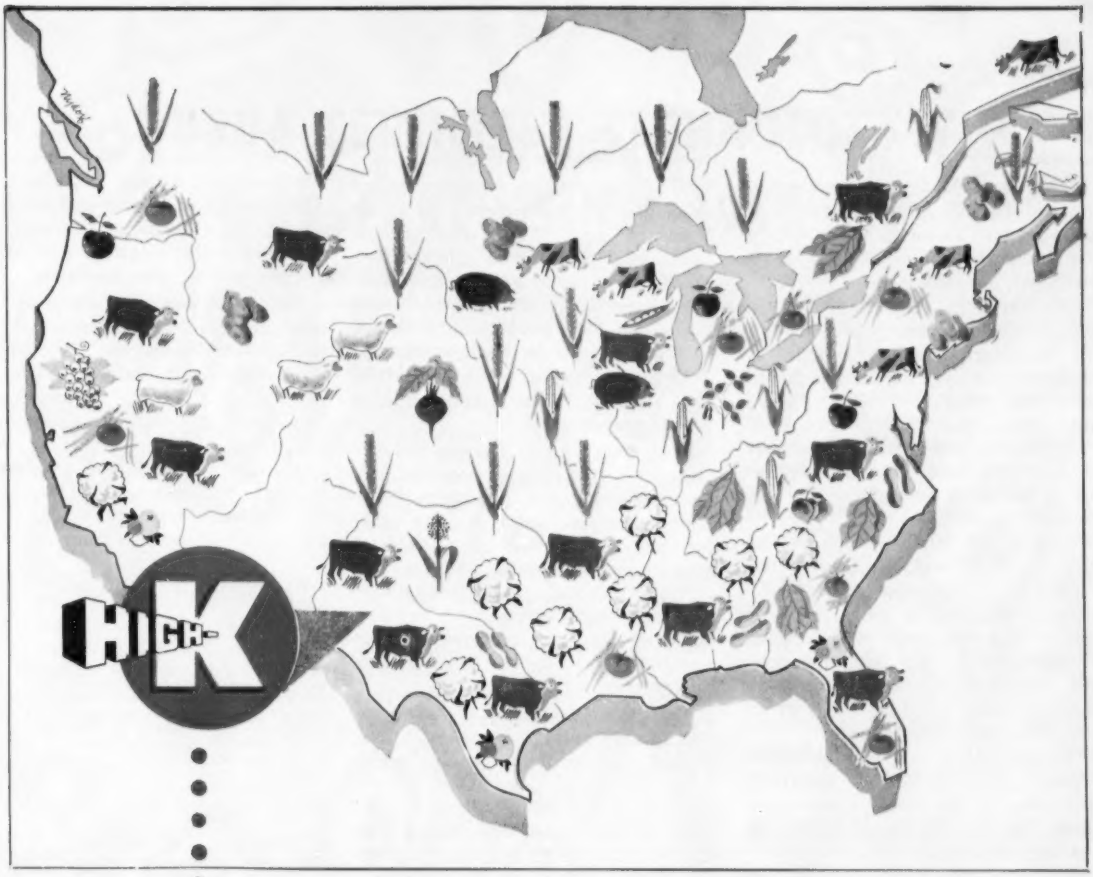
Education and promotion in the matter of getting farmers to follow agronomists' recommendations to use fertilizer fully and wisely, is a never-ending job, Truitt concluded.

"Let us all keep at it," he said, "and let us not allow the true perspective of the future to be altered by temporary ups-and-downs, and by admittedly troublesome surpluses.

"In my view, the future is not assured as easy, but is assured as bright. More fertilizer will be needed, produced and used—all to the benefit of consumers and farmers alike."

In a discussion on "What Does the Future offer the Fertilizer Industry?", Harold E. Myers, Kansas Agricultural Experiment Station declared that the industry will have a greatly enlarged opportunity to be of service to the consuming public. If the industry accepts the challenge, he said, the United States should

1. Harold Vorhes, Virginia-Carolina Chemical Corp., John D. Zigler, International Minerals & Chem. Corp. 2. H. E. Myers, Kansas State College, A. H. Bowers, Swift & Co., J. L. Haynes, Ohio Agri. Experiment Station, W. H. Pierre, Iowa State College. 3. J. D. Stewart, Jr., Federal Chemical Co., Pierce Vandercook, Armour Fert. Wks., Harold Vorhes, Virginia-Carolina Chemical Corp., Floyd Lucas and Carl Stillings, both of Federal Chemical Co. 4. W. P. Martin, Ohio State University, Harry L. Cook, Farm Bureau Coop. Ass'n., Inc., Ohio. 5. E. B. Norum, North Dakota Agric. College, and G. M. Browning, Iowa State College.



Southwest serves agriculture

...by using modern mining facilities and up-to-date processes to produce HIGH-K* Muriate of Potash for plant food manufacturers.

Southwest Potash Corporation

HIGH-K Potash

*Trade-mark

61 BROADWAY ★ NEW YORK 6, N. Y.

continue to enjoy economical production of high quality food in abundance.

"The continued improvement in the soil testing program should be an important factor in the ability of the industry to be of service to farmers," he said.

"As the soil tests improve, the dealers and salesmen will be able to fill soil prescriptions as needed. The dealer should help the farmer understand his fertilizer problems much more thoroughly than he now does. This means a more enlightened dealer, and one who sells his product for what it is in relation to the farmer's need.

"The future offers an opportunity to expand the consumption of fertilizers by intensifying the sales program in those areas where crop response and economic studies show a possibility for an expanded market. This tremendous possibility for enlarged sales is on the basis of information available today.

"Fertilizer use should continue to expand. In only a few instances, involving a few crops and small areas, has the economic ceiling of use been reached."

Myers said the future should witness a greatly increased use of fertilizer on pastures and forage crops, and in general on crops used for runoff and erosion control. An adequate pasture fertilization program, he said, will do much to make pasture improvement a reality.

"The fertilization program, to be successful, must be a part of sound livestock and grass management programs," he said. "Provision should be made to harvest and store the surplus high quality feed during periods of high production. Pasture fertilization will do much toward reducing the surplus of grain crops, stabilizing agriculture, and reducing runoff and erosions."

A. J. Ohlrogge, of Purdue University, presented the agonomists' recommendations for minimum fertilizer grades and ratios for the 1954-55 crop year in the 13 Corn Belt States represented at the meeting.

A question and answer session was the program's concluding feature, with a panel of agronomists answering questions set forth by industry men.

On three succeeding days before the joint meeting, agronomists attended sessions of the North Central Soils Research Committee at the Palmer House in Chicago. G. W. Volk, Ohio State University, was chairman. Soils Extension men from the 13 states came to Chicago for a meeting on February 18, and stayed on for sessions of the joint meeting of the agronomists and industry representatives.

At the conclusion of the joint meeting's program, Chairman Floyd W. Smith extended the agronomists' thanks to the Middle West Soil Improvement Committee and to Z. H. Beers, its executive secretary, for sponsoring the meeting, and bringing the college men together.

For several days preceding the meeting, the Middle West Soil Improvement Committee, in cooperation with radio stations WLS and WGN in Chicago, arranged for broadcasts in which the agronomists told farm audiences about soil testing, more efficient crop production through fertilizer use, and methods for increasing corn and wheat yields per acre. These programs included "live" appearances, as well as transcriptions cut for later broadcasting.

1. A. L. Lang, University of Illinois, R. R. Poynor, International Harvester Co., G. L. Bunting, Central Farmers Fert. Co. 2. Roy Howe, Howe, Inc., James E. Madigan, Fertilizer Engineering & Equipment Co. 3. George Gist, Ohio State University, R. J. Fleming, National Fertilizer Co. 4. Bob Garn, Farm Bureau Coop. Assn., Inc., (Ohio), B. P. Reidman, Farmers Fert. Co., Dean Boldt, Spencer Chemical Co. 5. H. H. Tucker, Coke Oven Ammonia Research Bureau, Garth Volk, Ohio State University, E. W. Harvey, Nitrogen Division, Allied Chem. & Dye Corp. 6. Harold Jones, University of Minnesota, George E. Smith, University of Missouri, Jim Rose, Nitrogen Division, Allied Chemical & Dye Corp. 7. J. J. Devlin, Southwest Potash Corp., Rex L. Morgan, Arkmo Plant Food Co., Jack Lindsey, International Minerals & Chemical Corp., Claude Byrd, Spencer Chemical Co.

USDA FERTILIZER TECHNOLOGY RESEARCH SINCE 1950

By K. D. JACOB
Soil and Water Conservation Research Branch
Agricultural Research Service
United States Department of Agriculture
Beltsville, Maryland

Fertilizer technology research in the Department of Agriculture prior to 1950 has been summarized in previous papers (**18, 35, 36**). The present paper deals with the subsequent work in this field.

With the reorganization of the Department of Agriculture in late 1953, the Division of Fertilizer and Agricultural Lime in the former Bureau of Plant Industry, Soils, and Agricultural Engineering became the Section of Fertilizer and Agricultural Lime in the Soil and Water Conservation Research Branch, Division of Farm and Land Management Research, Agricultural Research Service. In addition to the Section of Fertilizer and Agricultural Lime, the Soil and Water Conservation Research Branch comprises the Section of Soil and Plant Relationships, the Eastern Section of Soil and Water Management, the Western Section of Soil and Water Management, and the Section of Watershed Hydrology.

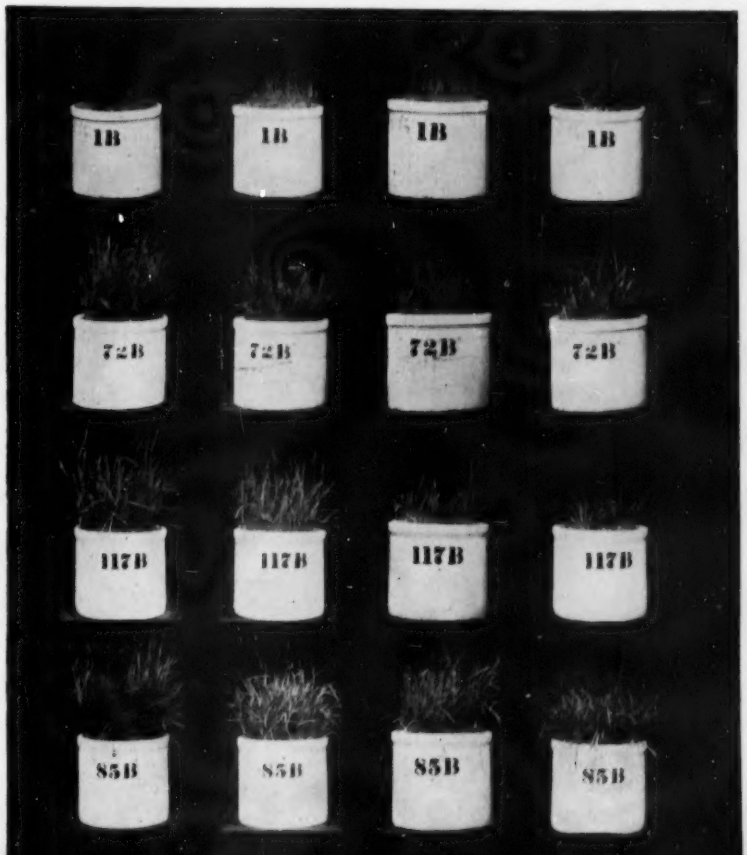
The Section of Fertilizer and Agricultural Lime and its predecessor units have been responsible for the Department's fertilizer technology research since 1911 when this work was first placed on a continuing basis in the former Bureau of Soils. The Section maintains close contacts with Federal, State, and private agencies interested in fertilizer and lime resources, technology, production, and use, as well as with industry associations, companies, and individuals. These contacts include cooperative studies and investigations.

Urea-Formaldehyde Products

Further studies (**4, 11, 17**) have been made of the preparation, properties, and nutrient value of the new class of synthetic nitrogen fertilizers, comprising urea-formaldehyde reaction products (urea-form), which have low solubility and high analysis (about 38 percent nitrogen). The solubility characteristics of the products depend markedly on the conditions under which they are prepared, especially as regards temperature, pH, concentration, and the ratio of the reactants. The most satisfactory products for fertilizer use are usually those having urea-formaldehyde mole ratios in the approximate range 1.25 to 1.35. Urea-form can be prepared in the form of granules that readily disintegrate in contact with the soil moisture. Quality evaluation of straight urea-form products can be done in the laboratory by means of soil nitrification tests and differential solubilities in water and in phosphate-buffer solutions.

Field tests of urea-form have included experiments on grass, tobacco, sugarcane, corn, and rice in the United States, Canada, and Puerto Rico. The results on corn and rice were inconclusive, and the experiments on sugarcane are still in progress. In an experiment on Bermuda grass in Georgia, urea-form was definitely superior to ammonium nitrate, ammonium sulfate, and sodium nitrate, and was equal to or better than Milorganite, cottonseed meal, and calcium cyanamide. Good results were also obtained on grass

Effect of urea-form on perennial ryegrass. Appearance of ryegrass just prior to the 1st, 2nd, 6th, and 8th harvests—21, 35, 112, and 180 days, respectively. 1B, no N; 72B, urea-form, 200 lb. N/acre; 117B, urea, 200 lb. N/acre; 85B, urea-form, 800 lb. N/acre.

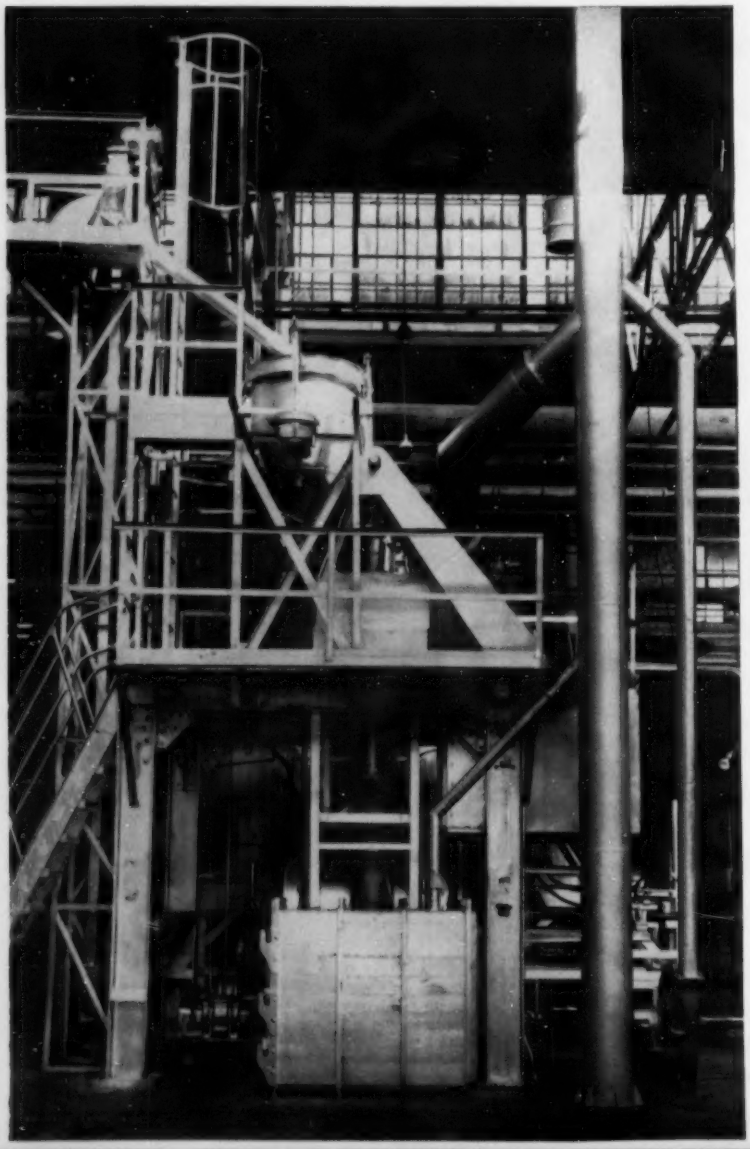


at Beltsville and in Pennsylvania. For several successive years improvement in the yield and quality of shade-grown tobacco in Connecticut has been noted as a result of using urea-form to supply 25 percent of the total nitrogen applied.

The over-all efficiency of properly formulated urea-formaldehyde products appears to equal or exceed that of the conventional nitrogen fertilizers for many crops, especially those having a long growing season. On turf, for example, single applications of urea-form, made at much higher nitrogen levels than are feasible with the more soluble nitrogen sources, are capable of supplying the crop's nitrogen requirements for an entire season. It should be emphasized, however, that the urea-formaldehyde resins commonly marketed to the plastics trade are so resistant to decomposition in the soil that they are practically worthless as sources of fertilizer nitrogen.

Production on a considerable scale of urea-formaldehyde materials specifically formulated and manufactured for fertilizer use is expected at an early date. The unit cost of the nitrogen in these materials will necessarily be higher than that of the nitrogen in urea and other chemical products, but it should compare favorably with the cost of nitrogen in oilseed meals and other high-grade natural organics.

Pilot plant for production of enriched superphosphate, Tennessee Valley Authority.

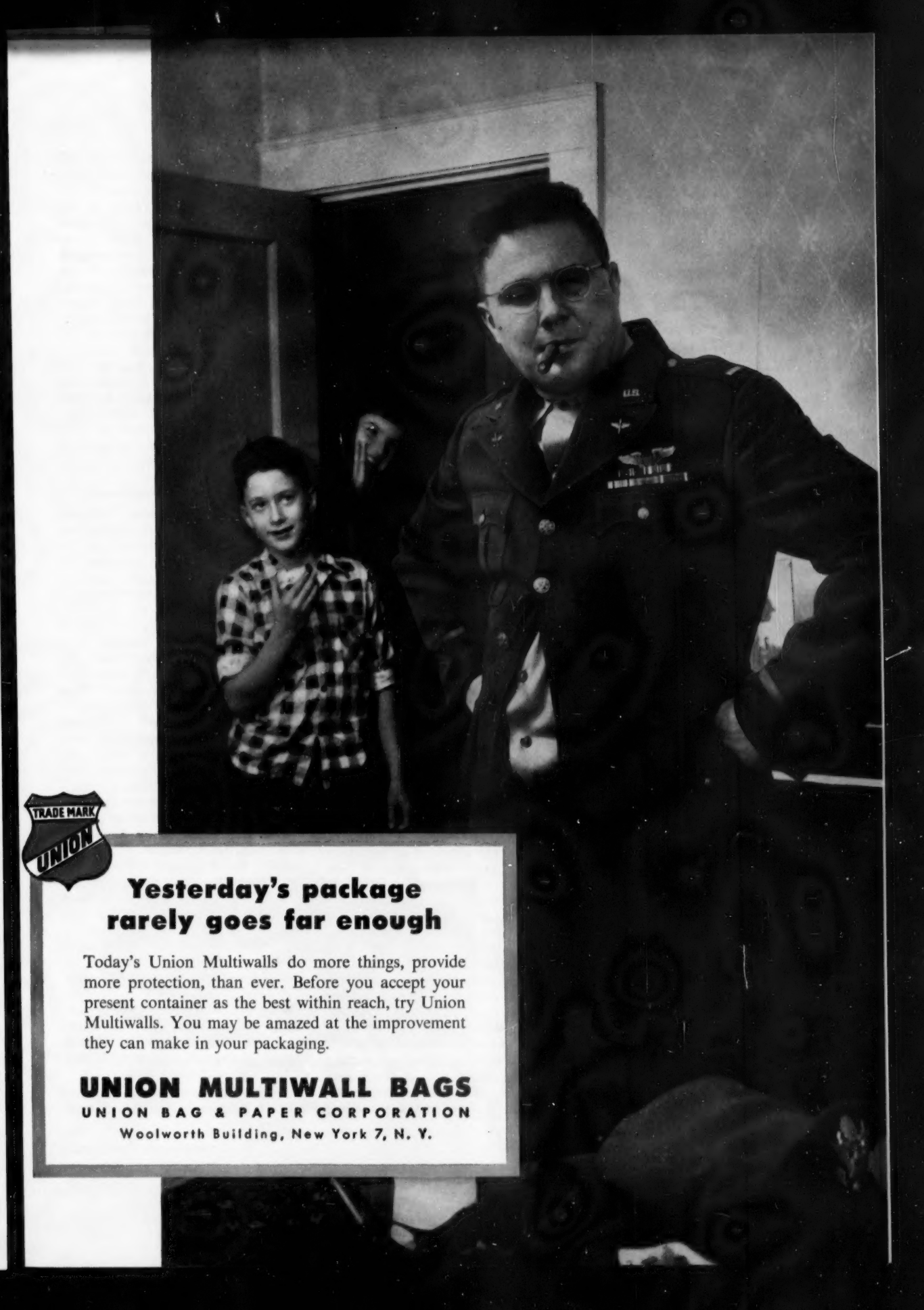


Enriched Superphosphate

The manufacture of many grades of high-analysis mixed fertilizers necessitates the use of phosphate materials of higher phosphorus content than normal superphosphate. For this purpose it has been the common practice to supplement the use of normal superphosphate by such additions of more concentrated materials, chiefly triple superphosphate, as are required to bring the phosphorus content of the mixture to the desired level. The rapidly growing trend toward higher analysis mixtures, together with the program for recovery of uranium as a by-product of the manufacture of wet-process phosphoric acid, has stimulated interest in the possibilities of using mixtures of sulfuric and phosphoric acids in normal superphosphate equipment to make products intermediate in grade between normal superphosphate and triple superphosphate.

In cooperation with the Tennessee Valley Authority, small-scale and pilot-plant studies were made of the acidulation of phosphate rock with mixtures of sulfuric and phosphoric acids to produce enriched superphosphates (**21, 70**). Information was obtained on the mixing, denning, and curing characteristics of the products, and the operating conditions that should be satisfactory for their manufacture in several types of normal superphosphate equipment were defined. The enriched superphosphates are as amenable to handling, ammoniation, and mixing as are the normal and triple superphosphates.

With acids of the proper concentrations, pile-cured products ranging in grade to triple superphosphate can be made satisfactorily with normal superphosphate equipment. For example, enriched superphosphates analyzing as high as 28 percent available P_2O_5 can be produced with appropriate proportions of contact sulfuric acid and phosphoric acid containing 45 percent H_3PO_4. Higher grades of superphosphate require the use of a more concentrated phosphoric acid.



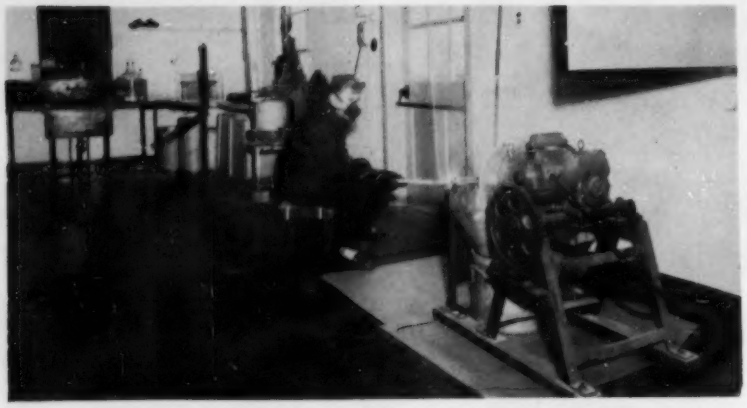
Yesterday's package rarely goes far enough

Today's Union Multiwalls do more things, provide more protection, than ever. Before you accept your present container as the best within reach, try Union Multiwalls. You may be amazed at the improvement they can make in your packaging.

UNION MULTIWALL BAGS

UNION BAG & PAPER CORPORATION

Woolworth Building, New York 7, N. Y.



Corner of plant for preparation of radioactive superphosphate. Excavation of 16-pound lot of superphosphate from stainless steel can in which the ingredients were mixed (mixer in background) and the product was cured in an oven (not shown) at 70° C.

Evaluation of Superphosphates Made with Spent Acids

The shortage of sulfuric acid in 1950 to 1952, which threatened for a time to assume very serious proportions, emphasized the importance of making the greatest possible use of spent and waste acids in the manufacture of fertilizers, specifically ammonium sulfate and superphosphate. The use of such acids involves among other things, however, the danger of detrimental or toxic effects on plants of the impurities present in the acid.

Earlier greenhouse and field tests had shown that heavy applications of normal superphosphate made with either sludge acid from the petroleum industry or alkylation acid from the production of aviation gasoline were not detrimental to a wide variety of crops (**6, 7, 39, 57**). On the other hand, superphosphate made with spent sulfuric acid from the manufacture of picric acid had adverse effects on tomato plants in the greenhouse when the superphosphate was applied to the soil, immediately before setting the plants, at rates that supplied more than 21.6 pounds of picric acid per acre (**59**).

In recent greenhouse tests (**69**) normal superphosphates made, respectively, with spent acids from the manufacture of an acrylic resin, from the oxidation of an anthraquinone derivative with manganese dioxide, and from a dye process were detrimental to Black Valentine beans in one way or another. In tests of superphosphates made with several kinds of spent sulfuric acids from DDT manufacture, products made with the so-called red acid (high in chlorobenzene sulfonic acid) were toxic to beans, especially at the higher rates of application, whereas those made with either "still bottom" acid or with black acid (obtained by treating the red acid to remove chlorobenzene) produced plant yields that were not significantly different from those obtained with equivalent quantities of virgin-acid superphosphate. Superphosphates made with spent acids containing small percentages of either anthracene or sulfonated coal-tar products, or with spent acid from chloral manufacture, had no harmful effects.

Ammoniation of Superphosphate

In the 25 years that ammoniation of superphosphate and mixed fertilizers containing superphosphate has been practiced in the United States, free ammonia—in the forms of anhydrous ammonia, ammonia liquor, and ammoniating solutions—fixed in this way has become a major source of nitrogen for the domestic fertilizer industry. Thus, it is estimated that such use provided an outlet for 170,000 tons of free ammonia in 1948-49 and some 255,000 tons in 1952-53.

The Section of Fertilizer and Agricultural Lime has made numerous investigations of the chemical reactions occurring in the ammoniation of superphosphate and of the properties and fertilizer value of the products. A recent study (**45**) of the optimum conditions for ammoniation has shown that the efficiency of the ammonia absorption is influenced by the moisture content and the particle size of the superphosphate and by the denseness and hardness of the particles, among other things. The absorption efficiency increases (1) with increase in the moisture content to about 7 percent and (2) with decrease in the average particle diameter to about 0.1 mm. (80 mesh). Soft, porous particles favor ammonia absorption, as compared to hard, dense particles. High temperatures favor the absorption of ammonia by triple superphosphate but not by normal superphosphate. At high levels of ammoniation the absorption efficiency is improved by prolonging the reaction period. Mixing the superphosphate with certain other fertilizer materials (ammonium sulfate, ammonium nitrate, and potassium chloride) has no effect on its capacity for absorbing ammonia.

Radioactive Phosphates

The Section maintains facilities for producing radioactive phosphate fertilizers for experimental use by persons, in government agencies and elsewhere, who are authorized by the Atomic Energy Commission to receive radioisotopes (**5, 32**). The variety and specifications of labeled materials necessarily change from year to year as experimental emphasis shifts among the phases of fertilizer and crop research. Thus far, the list of labeled fertilizers includes normal, enriched, triple, and ammoniated superphosphates in both granular and nongranular forms, dicalcium phosphate, monoammonium phosphate, fused tricalcium phosphate, (defluorinated phosphate rock) calcium metaphosphate glass, granular and pulverulent mixed fertilizers, and numerous special materials tailored to fit unusual types of experiments. For the most part the labeled materials have been used by the several sections of the Soil and Water Conservation Research Branch and numerous State agricultural experiment stations in research investigations dealing largely with the plant uptake of applied phosphorus as related to plant species, soil type and fertility level, type and solubility of phosphorus carrier, placement and particle size of fertilizer, and other factors.

The labeling compound is monopotassium phosphate purchased from

Albemarle Integration

helps speed deliveries . . .

"Al. Kraft" is the doctor when it comes to speeding deliveries of Albemarle Multiwall sacks. That's because he can keep his finger on the pulse of the complete operation . . . from wood pulp to finished bags.

Albemarle Multiwalls come from a completely integrated mill that not only makes its own stout Kraft but has unusual facilities for color matching and printing. Albemarle's own machines paste and sew plain or valved bags in plies to suit your specifications.

FOR Multiwall CALL Albemarle

ALBEMARLE PAPER MANUFACTURING COMPANY • RICHMOND, VIRGINIA

EASTERN SALES OFFICE: NEW YORK CITY • SOUTHERN SALES OFFICE: BALTIMORE, MD.
MIDWEST SALES OFFICE: CHICAGO, ILLINOIS

DUK-PAK Kraft Bags

shed water resist abrasion and stay cleaner!

and A&S Duk-Pak Kraft bags cost no more than *ordinary* multiwall bags!

Yes, Arkell & Smiths' extensive tests prove that DUK-PAK has greater resistance to exposure, moisture and to weather — like the proverbial you-know-what! What's more, DUK-PAK has a special, "built-in" reinforced quality which makes it resistant to scuffing and abrasion. Where ordinary multiwall bags might "give-way" under rough handling, DUK-PAK holds its own, longer. This adds up to:

1. DUK-PAK provides dependable packaging for products that don't like water, moisture, or dirt, and

2. DUK-PAK protects your brand name and advertising which appear on the package.

Let Arkell & Smiths' 95 years of packaging "know how" serve you! Our Packaging Team — specialists in every phase of the operation — are prepared to tackle your specific problem. Address your inquiry to our Packaging Engineering Department at Canajoharie, N. Y.

ARKELL and SMITHS the oldest name in paper bags

ARKELL and SMITHS

CANAJOHARIE, N. Y. • WELLSBURG, W.VA. • MOBILE, ALA.

the Oak Ridge National Laboratory, Oak Ridge, Tenn. Annual production of fertilizers containing active phosphorus totals some 300 pounds of P_2O_5.

Surface Active Agents in Fertilizer Manufacture

The announcement in 1952 that marked improvement in the physical condition of superphosphates and nongranular mixed fertilizers can be obtained by the inclusion of small quantities (0.05 percent or less) of a surface active agent (wetting agent or surfactant) aroused widespread interest in the fertilizer industry, with the result that such use of these agents rapidly came into considerable practice. Conflicting reports as to the benefits derived from the use of surfactants under factory conditions soon emphasized, however, the need for systematic investigation of their behavior in fertilizers. Such an investigation was undertaken by the Section of Fertilizer and Agricultural Lime.

In a laboratory study of the influence of additions of typical anionic and nonionic surfactants in the preparation of normal and triple superphosphates from Florida and Wyoming phosphate rocks, beneficial results from the use of surfactants were limited almost entirely to improvements in the physical character of the products, especially in their ease of removal from the den (**19, 20**). The nonionic surfactants were generally more effective than the anionic materials, and improvement in the physical condition was more pronounced with triple superphosphate than with normal superphosphate. Surfactants had no significant effect on acid consumption or on the rate of reaction.

Work now in progress indicates that some surfactants, when intimately incorporated in mixed fertilizers either as a constituent of the superphosphate or as an individual ingredient, have a favorable influence on the ammonia-absorbing capacity of the superphosphate and on the physical condition of the mixtures, whereas others have no effect. None of the several types and kinds of surfactants that have been tested appear to have properties that insure the elimination of caking in fertilizers under the variable conditions encountered in commercial practice.

Basic Studies in Fertilizer Systems

Considerable attention has been given to the chemical and physical relationships between resident compounds of mixed fertilizers with special reference to the nutritive value of the water-insoluble phosphorus. The work, necessarily slow at first but now beginning to develop satisfactorily, involves (1) the characterization of dicalcium phosphate and apatite-like basic phosphates (inclusive of phosphate rock, partially attacked rock in superphosphate, and water-insoluble phosphates developed during heavy neutralization of superphosphate with ammonia) and (2) the delineation of the effects of sundry soluble substances that accompany the phosphates in nutrient mixtures. Characterization of the phosphate calls for physical and chemical measurements, such as specific surface, solubility, and rate of solution, as well as chemical analysis. The possible influences of soluble substances are best indicated by determining the solubility of the phosphate in salt solutions over the range from moderate concentrations up to saturation. The effectiveness of phosphate-salt combinations, in different placement patterns and under sundry soil environments, are being studied in greenhouse culture, with a view towards relating incidence of crop response to magnitude of properties that can be measured in the laboratory.

Composition of Mixed Fertilizers

More than 400 samples representative of the mixed fertilizers marketed in 25 States throughout the country during the 1949-50 season were analyzed for acid-insoluble ash, carbon dioxide, and total, available, and water-soluble phosphorus (**14, 16**). The content of acid-insoluble ash, indicative of the quantity of inert filler, averaged 196 pounds per ton; it ranged from an average of 100 pounds in the Mountain States to 272 pounds in the South Atlantic States. The calcium carbonate equivalent of the carbon dioxide, indicative of the quantity of limestone, averaged 109 pounds per ton; it ranged from an average of 58 pounds in the Pacific States to 202 pounds in the East South Central States.

The availability of the phosphorus averaged 93.0 percent, and the differences among the averages for the several regions were small. The average water solubility of the phosphorus (46.9 percent for all the samples) ranged from 35.2 and 39.8 percent in the East South Central and South Atlantic States to 64.6 and 70.7 in the Pacific and Mountain States. The low water solubility of the phosphorus in the first two regions reflects the general practices therein of (1) high-level ammoniation and (2) extensive use of limestone in the preparation of nonacid-forming mixtures. The principal factors contributing to the relatively high water solubility of the phosphorus in the Mountain and Pacific States were (1) the limited use of ammoniation at the time of the survey and (2) the preference for acid-forming mixtures because of the predominantly alkaline nature of the soils.

The average water solubility of the phosphorus in mixed fertilizers marketed in the United States did not fluctuate greatly during the period 1870 to 1948 (**48**). It was 48.0 percent in 1870-79 and the range was from 44.8 percent in 1940-49 to 55.7 percent in 1920-29.

Conditioning Agents for Mixed Fertilizers

Studies have been made of the moisture absorbing capacity, particle size, apparent density, and other properties of numerous materials in relation to their relative efficiency in reducing the caking tendency and otherwise improving the physical condition of nongranular, high-analysis mixed fertilizers, such as the 10-10-10 grade (**24, 25**). The materials included oilseed and hull meals and other plant residues, organic and inorganic byproducts from industrial operations, and natural inorganic materials, such as clays, diatomaceous earth, rock dusts, and vermiculite. None of the materials

MONTANSALPETER

AMMONIUM SULPHATE NITRATE

26% NITROGEN

supplies the 2 key forms of nitrogen

Contains 6½% nitrate nitrogen — quick acting for early, vigorous growth. Contains 19½% ammonia nitrogen — slower acting for sustained growth through to harvest time.

easy to use

Pelletized and properly sized for flow. Easy to handle, ready to use for top dressing, side dressing and irrigation.

now available

F.O.B. all regular Atlantic and Gulf ports, shipped to the trade in even-weight bags. Write us today for a sample and further information.

Sole Distributors for
RUHR-STICKSTOFF AKTIENGESELLSCHAFT
Bochum, Germany

H. J. BAKER & BRO.

established 1850

600 Fifth Ave., New York 20, N. Y.
Branch Offices:
Maryland Trust Bldg., Baltimore, Md.
209 South LaSalle St., Chicago, Ill.
Savannah Bank & Trust Co. Bldg., Savannah, Ga.
501 Jackson St., Tampa, Fla.

Bemis B-FLEX

A Better Multiwall Valve Bag FOR LESS!

Look at these B-FLEX benefits:

LOWER BAG COSTS . . . Save up to $2.50 per thousand.

FASTER PACKING . . . LOWER PRODUCTION COSTS.

UNIFORM WEIGHTS . . . stop over-packing.

MINIMUM SIFTING.

CUSTOMER SATISFACTION . . . no loose, torn sleeves to get into the farmer's drill.

Ask your Bemis Man for the *complete* B-FLEX story.

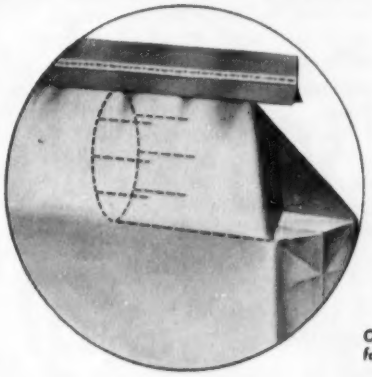
With Bemis B-FLEX Bags, you also get the same bonus you get with all Bemis Multiwalls—**BEMIS MULTI-COLOR PRINTING** . . . your brand at its finest on multiwall bags.

Bemis

BEMIS BRO BAG COMPANY

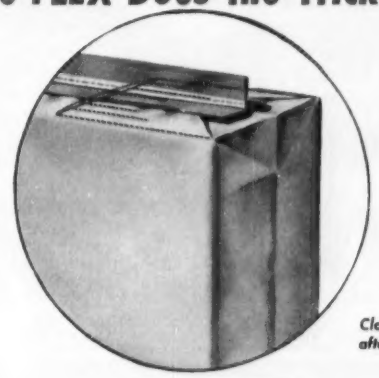
General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

Here's Why It's Better . . .

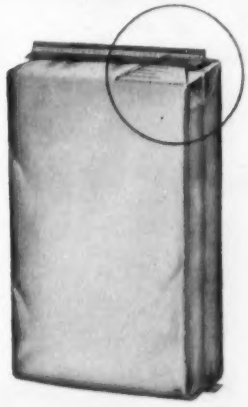


Open . . . for filling

The FLEX Does the Trick . . .



Closed . . . after filling



prevented caking, but all alleviated it to some degree. Inclusion of 1 percent of magnesium oxide in the mixture gave better protection against caking than did 5 percent of most of the inert conditioners tested.

A high capacity for absorption of moisture appears to enhance the ability of finely divided materials to adhere to and coat the surface of the fertilizer particles and to increase their conditioning value. In general, a low apparent density appears to enhance the conditioning effect of the material, but extremely light-weight materials tend to increase segregation in the mixture.

Important factors in the use of inert conditioning agents are (1) formulation of the mixture with fertilizer materials that have low caking tendencies, (2) use of coarse rather than finely divided fertilizer materials, and (3) maintenance of a low moisture content in the mixture.

Higher Analysis Mixed Fertilizers

For more than 30 years the Section of Fertilizer and Agricultural Lime and its predecessor units in the Department have emphasized the economic advantages to be gained by reducing the quantities of makeweight filler and other extraneous materials in mixed fertilizers, thereby increasing the concentration of primary plant nutrients (N, available P_2O_5, and K_2O). The ultimate goal is, of course, to supply the farmer with agronomically efficient mixtures at the lowest unit costs consistent with the specific requirements of his soils, crops, and farming system. The attainment of this goal involves, however, many problems of the formulation, processing, and physical condition of the higher analysis mixtures, as well as of their marketing and their acceptance by the farmer. The Section has long given major attention to these problems (**1, 12, 34, 50, 52, 60**).

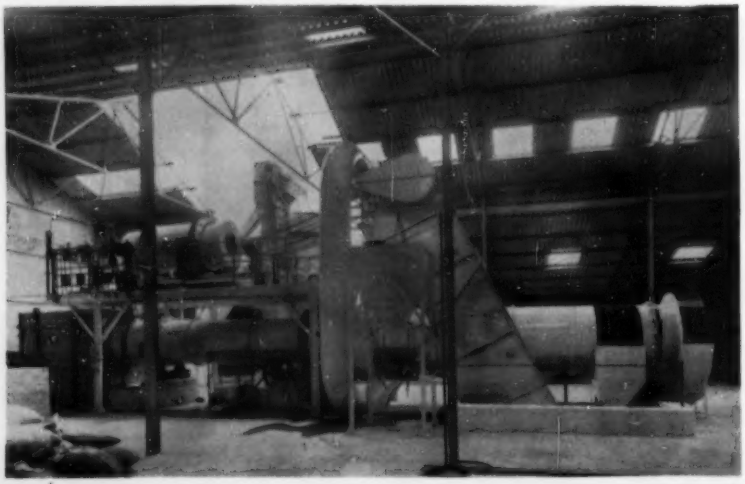
The total concentration of primary nutrients in mixed fertilizers has gradually increased from 13.9 percent in 1900 to 17.9 percent in 1930, to 20.9 percent in 1943-44, and then more rapidly to nearly 26 percent in 1952-53. With the large additional quantities of concentrated materials that will become available in the present program for expansion of fertilizer production, it is estimated that the average concentration of primary nutrients in mixed fertilizers can be increased to about 30 percent by reducing the average content of makeweight filler and other extraneous materials to approximately 12 percent from its present level of 20 percent (1). For the country as a whole, this would still permit the use of approximately the same proportions of conditioning agents and of liming materials (to serve as neutralizing agent and to supply nutrient magnesium where needed) as were used in 1950-51. It would also permit the addition of trace nutrient materials at or somewhat below the 1950-51 level and the use of makeweight filler at less than half the 1950-51 level of some 10 percent.

Granulation of Mixed Fertilizers

The industry is showing increasingly great interest in granulation as a means for improving the storage quality and drillability of mixed fertilizers. For example, granular products now account for 80 percent or more of the mixed-fertilizer output in the United Kingdom, and manufacture of such products is extensively practiced in France. It is estimated that toward the end of 1953 some 45 plants were operating or installing granulation units in the United States and that the production of granular mixtures was at the rate of about 1,000,000 tons annually or approximately 6 percent of the total output of mixed fertilizers. The expectation seems justified that within the next few years a high proportion of the domestic production of mixed fertilizers will be in granular form.

Investigation of the preparation of granular mixtures and their storage and handling characteristics has long been a major phase of the Section's research program (**22, 23, 26, 27, 46**). The current work involves chiefly studies of high-nitrogen mixtures, especially those having 1:1:1 nutrient ratios in grades as high as 15-15-15, in which the nitrogen is supplied mostly or entirely in the form of free ammonia together with ammonium nitrate and/or urea. The initial results of this work, which is being done in cooperation with the Tennessee Valley Authority, indicate that with close control of the temperature-moisture relationships, especially in the agglomeration stage, high yields of product in the desirable particle-size range of 6 to 20 mesh are possible.

Fertilizer granulation plant in England. (Courtesy of Sturtevant Engineering Co., Ltd.)



Methods of Analysis

For many years, cooperation has been maintained with the Association of Official Agricultural Chemists in the development and improvement of analytical methods. Recent work of this kind has comprised studies of methods for the determination of moisture in all types of fertilizers (**31, 33**), carbon dioxide and acid-insoluble ash in mixed fertilizers (**13**), and available phosphorus in furnace products such as calcium metaphosphate, defluorinated phosphate rock, and phosphate rock magnesium silicate glass (**40, 41, 44**). The factors involved in the

laboratory evaluation of phosphate fertilizers have been reviewed (**42**), and studies are being made of the direct determination of available phosphorus by analysis of the combined water and citrate extracts (**43**).

The solubility of the phosphorus of furnace products in neutral ammonium citrate solution, under the conditions of the official method, and its efficiency in promoting plant growth depend considerably on the particle size of the material. The particle-size effects can be completely or largely eliminated by grinding the material to pass the 80-mesh sieve. As compared with intermittent agitation, higher results for available phosphorus in water-insoluble phosphates are favored by continuous agitation during the citrate digestion of the sample.

Surveys of Fertilizers and Plant Nutrients

Annual surveys of the consumption of fertilizers and plant nutrients in the United States and Territories were initiated by the Section of Fertilizer and Agricultural Lime in 1941. These surveys, the results of which are mostly reported on the basis of the individual States and Territories, include the total quantities of fertilizers and primary nutrients (N, available P_2O_5, and K_2O) used as mixtures and separate materials, respectively, the quantities of the several types and principal grades of mixtures, the quantities of the various kinds of materials used separately as fertilizers, and the respective average percentages of primary nutrients in the mixtures and materials.

During the period 1941 to 1952-53 the annual consumption of fertilizers increased 149 percent to about 23,143,000 tons (**56, 63, 64, 65, 66**). Likewise, the consumption of primary nutrients increased 193 percent to 5,562,000 tons (N, 1,616,000; available P_2O_5, 2,233,000; K_2O, 1,713,000). Mixed fertilizers accounted for 44.4 percent of the nitrogen, 78.6 percent of the available P_2O_5, and 89.2 percent of the K_2O consumed in 1952-53. The respective percentages in 1941 were 49.3, 57.5, and 84.7.

Other studies under this phase of the Section's work have dealt with the nonfarm use of fertilizers (**61**), price relationships of fertilizers (**54**), fertilizer expenditures in relation to farm income (**49, 55**), fertilizers for specific crops (**51, 58**), composition of mixed fertilizers in relation to guarantees (**62**), and facilities and capacities for manufacture of fertilizers (**2, 29, 37, 38**). The Section has cooperated with the soil management sections of the Soil and Water Conservation Research Branch, the Northeastern Soil Research Committee, and the Fertilizer Work Group of the National Soil and Fertilizer Research Committee in studies of (1) the changing fertility of New England soils and (2) fertilizer use and crop yields, which are in course of publication. In prepara-

Triangle Brand Copper Sulphate has been recognized as an effective agricultural chemical for more than sixty years. In sprays (where Bordeaux mixtures are the most reliable), in dusts (if you prefer them) and in fertilizers (for additional enrichment of the soil) Triangle Brand Copper Sulphate has proved itself worthy and dependable. Try these Triangle Brand forms of Copper Sulphates:

INSTANT (powder) for quick and efficient mixing of Bordeaux sprays.

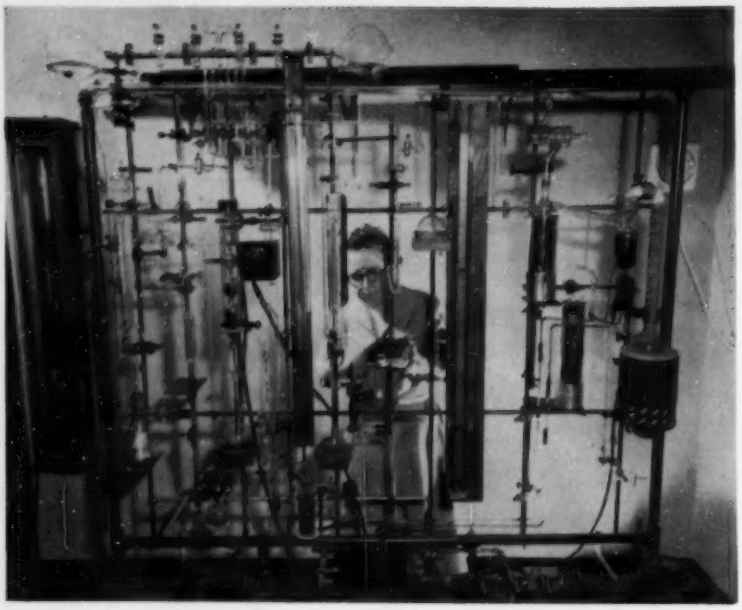
SUPERFINE (snow), SMALL or LARGE CRYSTALS, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

Write for booklets that will help you solve your agricultural problems.

PHELPS DODGE REFINING CORP.
40 WALL ST., NEW YORK 5, N. Y. • 230 N. MICHIGAN AVE., CHICAGO, ILL.

PHELPS DODGE REFINING CORPORATION
NICHOLS
TRIANGLE BRAND
CHEMICALS
40 WALL ST NEW YORK



Apparatus for determining surface area of agricultural liming materials by gas adsorption.

tion is a manual of fertilizer statistics for the United States which endeavors to bring together, for the first time, comprehensive data on fertilizer and plant nutrient production, consumption, trade, and use since the beginning of the industry. The Section attempts to keep informed of developments in foreign countries with respect to resources, processing, production, and use of fertilizers.

Liming Materials

Some 27 to 28 million tons of agricultural liming materials valued at more than $100 million are used annually in the United States. Until 1947, however, the Department had no organized program of research on the technology of liming materials.

Studies of blast-furnace, phosphorus-furnace, and basic slags **(9, 10)** showed that these materials contain relatively high percentages of manganese and much smaller percentages of boron, cobalt, copper, zinc, and molybdenum. Magnesium is an important constituent of blast-furnace and basic slags. Greenhouse experiments with sweet clover indicated that blast-furnace slag supplies important quantities of manganese for plant nutrition, and that it assists in maintaining the nutrient status of soils and plants with respect to the other trace elements, especially boron. In its liming action and ability to promote crop yields, properly prepared blast-furnace slag is substantially equal to limestone. Phosphorus-furnace and basic slags have high liming values, also.

Investigations of procedures for the laboratory evaluation of liming materials, now in progress in cooperation with the Ohio Agricultural Experiment Station, include studies of the absolute and relative surface areas of such materials, as determined, respectively, by the gas-adsorption method and the oxalate method. It appears that the reactivities of different types and kinds of liming materials and their particle-size fractions, as determined by the ammonium chloride distillation procedure **(67)**, are related to both the absolute and the relative surface areas. Other work in progress includes surveys of the occurrence of trace elements in limestone, investigations, of the utilization of various industrial by-products and wastes as liming materials, and studies of the reaction rates of liming materials in soils **(68)**.

Other Work

Other studies, recently completed or in progress, include the formulation and properties of tobacco plant-bed fertilizers; the occurrence, nature, and characteristics of certain natural phosphates **(8, 28, 30)**; phosphate rock as an economic source of fluorine; manufacture of nitraphosphates in Europe **(15)**; effect of aluminum and iron in superphosphate **(47)**; peat and muck **(3)**; combination fertilizers and pesticides **(53)**; and composition and properties of trace-element glasses. A bulletin dealing with the composition and properties of fertilizers, manures, liming materials, and soil amendments is in preparation.

Literature Cited

1. Adams, J. R., Parker, F. W., and Jacob, K. D. Higher Analysis Mixed Fertilizers as a Factor in More Efficient Use of Plant Nutrients. *Agr. Chemicals 8*, No. 1, 36-40, 125, 127 (1953).
2. Adams, J. R., Tremearne, T. H., Jacob, K. D., and Porter, L. G. Survey of the Superphosphate and Wet-Process Phosphoric Acid Industries in the United States in 1950 and 1951. U. S. Dept. Agr., Bur. Plant Ind., Soils, and Agr. Eng. and Office Materials and Facilities, 44 pp., May 14, 1952, processed.
3. Anderson, M. S., Blake, S. F., and Mehring, A. L. Peat and Muck in Agriculture. *U. S. Dept. Agr. Circ. 888*, 31 pp. (1951).
4. Armiger, W. H., Clark, K. G., Lundstrom, F. O., and Blair, A. E. Urea-form: Greenhouse Studies with Perennial Ryegrass. *Agron. J. 43*, 123-127 (1951).
5. Borland, J. W., MacKenzie, A. J., and Hill, W. L. Characterization of Nonorthophosphate P^{32} in Neutron-Irradiated Potassium Dihydrogen Phosphate. *Ind. Eng. Chem. 44*, 2726-2728 (1952).
6. Brown, B. E., Campbell, J. C., Hawkins, A., Houghland, G. V. C., and Jacob, K. D. An Evaluation of Sludge-Acid and Alkylation-Acid Superphosphates as Sources of Phosphorus in Potato Fertilizers. *Am. Potato J. 20*, 89-95 (1943).
7. Brown, B. E., Jacob, K. D., and Reid, F. R. Plant Culture and Nitrification Studies with Sludge-Acid Superphosphate. *Am. Fertilizer 96*, No. 7, 5-6, 24, 26 (1942).
8. Cady, J. G., Hill, W. L., Miller, E. V., and Magness, R. M. Occurrence of Beta Tricalcium Phosphate in Northern Mexico. *Am. Mineralogist 37*, 180-183 (1952).
9. Chichilo, P. P., Armiger, W. H., Specht, A. W., and Whittaker, C. W. Influence of Limestone and Blast-Furnace Slag on Chemical Composition and Yield of Sweet Clover and on Soil pH. *J. Agr. and Food Chem. 2* (In Press).
10. Chichilo, P. P., and Whittaker, C. W. Trace Elements in Agricultural Slags. *Agron. J. 45*, 1-5 (1953).
11. Clark, K. G. Urea-Form—New Nitrogen Fertilizer. *Crops & Soils 4*, No. 8, 14-15 (1952).
12. Clark, K. G., and Bear, F. E. Use of Natural Organics in Mixed Fertilizers. *Am. Fertilizer 108*, No. 3, 7-10, 24, 26, 28, 30 (1948).
13. Clark, K. G., and Gaddy, V. L. Report on Inert Materials in Fertilizers: Carbonate Carbon or Calcium Carbonate Equivalent and Acid-Insoluble Ash. *J. Assoc. Offic. Agr. Chemists 36*, 655-661 (1953).
14. Clark, K. G., Gaddy, V. L., Blair, A. E., and Lundstrom, F. O. Mixed Fertilizers. *Farm Chemicals 115*, No. 6, 21, 23-26 (1952).
15. Clark, K. G., and Hardesty, J. O. Treatment of Phosphate Rock with Nitric Acid. *Agr. Chemicals 6*, No. 9, 42-46, 113, 115, 117 (1951).
16. Clark, K. G., and Hoffman, W. M. Mixed Fertilizers. *Farm Chemicals 115*, No. 5, 17-19, 21, 23 (1952).
17. Clark, K. G., Yee, J. Y., Love, K. S., and Boyd, T. A. Preparation and Properties of Urea-Form. *Ind. Eng. Chem. 43*, 871-875 (1951).
18. Davis, R. O. E. Forty Years of Fertilizer Research. *Chem. Eng. News 27*, 410-412 (1949).
19. [Fox, E. J.] Surfactants and Superphosphate: A Discussion—USDA Reviews Studies on Use in Phosphate Rock Acidulation. *Fertilizer Process Progress 2*, No. 10, 1-2 (1953).
20. Fox, E. J., Batson, H. E., Jr., and Breen, A. V. The Use of Surface Active Agents in Phosphate Rock Acidulation. *J. Agr. and Food Chem. 2*, (In Press).

each pellet . . a

BALANCED

diet for

mother earth

COMPLEX FERTILIZER

by **C&I**

C&I's NEW NITROPHOSPHATE PLANT USES THE PEC* CONTINUOUS CHEMICAL PROCESSES . . . . it is simple, compact and produces a SUPERIOR PELLETED FERTILIZER that will not cake—can be stored in bulk or bags—is easy to handle and can be applied without special equipment.

Stabilization can be accomplished with CO_2 (patented CARBONITRIC process), H_2SO_4, H_3PO_4 or K_2SO_4. This provides a wide flexibility in choice of raw materials and product composition. High analysis fertilizer can be manufactured by these processes for approximately half the cost of a similar grade produced by antiquated mixing methods.

C&I can furnish the COMPLETE FACILITIES FOR PRODUCTION OF PELLETED COMPLEX FERTILIZER WHICH INCLUDE AMMONIA, NITRIC ACID AND COMPLEX FERTILIZER UNITS. Capacities from 200 tons of fertilizer per day to any desired amount. These facilities are available at a FIXED PRICE with PRODUCTIONS and EFFICIENCIES FULLY GUARANTEED!

Specialists in C&I *Processing Ammonia*

THE CHEMICAL AND INDUSTRIAL CORP.

CINCINNATI 26, OHIO

* Potasse et Engrais Chimiques

PEC

21. Fox, E. J., and Hill, W. L. Superphosphate Acidulation with Mixtures of Sulfuric and Phosphoric Acids. *Ind. Eng. Chem. 44,* 1532-1536 (1952).

22. [Hardesty, J. O.] USDA Discusses the Granulation of Mixed Fertilizers. *Fertilizer Process Progress 1,* No. 9, 1-3 (1952).

23. Hardesty, J. O., and Clark, K. G. Granulation of Fertilizers. *Agr. Chemicals 6,* No. 1, 34-38, 95, 97 (1951).

24. Hardesty, J. O., and Kumagai, R. Some Properties of Fertilizer Conditioning Agents. *Am. Fertilizer 111,* No. 12, 7-10, 22, 24, 26, 28 (1949).

25. Hardesty, J. O., and Kumagai, R. Factors Influencing the Efficiency of Fertilizer Conditioning Agents. *Agr. Chemicals 7,* No. 2, 38-39, 115, 117, 119; No. 3, 55, 125, 127, 129 (1952).

26. Hardesty, J. O., and Ross, W. H. Factors Affecting Granulation of Fertilizer Mixtures. *Ind. Eng. Chem. 30,* 668-672 (1938).

27. Hardesty, J. O., Ross, W. H., and Jacob, K. D. The Granulation of Fertilizers by the Rotary Drying Method. *Am. Fertilizer 92,* No. 7, 5-8, 24, 26 (1940).

28. Hendricks, S. B., and Hill, W. L. The Nature of Bone and Phosphate Rock. *Proc Natl. Acad. Sci. U. S. 36,* 731-737 (1950).

29. Hill, W. L. Elemental Phosphorus and Phosphoric Acid in Fertilizer Industry. *Ind. Eng. Chem. 44,* 1526-1532 (1952).

30. Hill, W. L., Armiger, W. H., and Gooch, S. D. Some Properties of Pseudowavellite from Florida. *Trans. Am. Inst. Mining Met. Engrs. 187,* 699-702 (1950).

31. Hill, W. L., Caro, J. H., and Kumagai, R. Report on Free Water in Fertilizers: Water Content of Sundry Fertilizers Shown by Official Method. *J. Assoc. Offic. Agr. Chemists 34,* 641-653 (1951).

32. Hill, W. L., Fox, E. J., and Mullins, J. F. Preparation of Radioactive Phosphate Fertilizers. *Ind. Eng. Chem. 41,* 1328-1334 (1949).

33. Hill, W. L., Hardesty, J. O., and Whittaker, C. W. Report on Moisture in Fertilizers. *J. Assoc. Offic. Agr. Chemists 32* 228-241 (1949).

34. Jacob, K. D. Development and Use of Fertilizer Materials in Relation to Higher Analysis Mixtures. *Am. Fertilizer 107,* No. 3, 7-9, 26, 28; No. 4, 9-10, 26, 28, 30 (1947).

35. Jacob, K. D. USDA and Fertilizer Technology. *Com. Fertilizer 80,* No. 5, 21-24, 26-27, 42, 56 (1950).

36. Jacob, K. D. Fertilizer Technology Research in the United States Department of Agriculture. *Fertilizer Soc. (London) Proc. 9,* 29-42 (1950).

37. Jacob, K. D. Processes and Facilities for Manufacture of Phosphate Fertilizers in the United States. *Com. Fertilizer 82,* No. 2, 20-22, 24, 26, 27, 29, 30-31, 34, 38 (1951).

38. Jacob, K. D. Phosphate Fertilizers for Western Agriculture. *Farm Chemicals 115,* No. 10, 21, 23-25, 27-29, 70-71 (1952).

39. Jacob, K. D., and Armiger, W. H. Field Experiments with Alkylation-Acid Superphosphate. *J. Am. Soc. Agron. 36,* 281-286 (1944).

40. Jacob, K. D., Armiger, W. H., Caro, J. H., and Hoffman, W. M. Report on Phosphoric Acid: Relation of Particle Size of Calcium Metaphosphate to its Citrate Solubility and Fertilizer Efficiency. *J. Assoc. Offic. Agr. Chemists 34,* 624-640 (1951).

41. Jacob, K. D., Caro, J. H., and Magness, R. M. Report on Phosphoric Acid in Fertilizers: Effect of Particle Size on Citrate Solubility of Calcium Metaphosphate. *J. Assoc. Offic. Agr. Chemists 35,* 666-673 (1952).

42. Jacob, K. D., and Hill, W. L. Laboratory Evaluation of Phosphate Fertilizers. *In* Soil and Fertilizer Phosphorus in Crop Nutrition, pp. 299-345, 1953. Academic Press, New York.

43. Jacob, K. D., Hoffman, W. M., and Schramm, F. C. Report on Phosphoric Acid in Fertilizers: Direct Determination of Available Phosphoric Acid by Volumetric and Photometric Procedures. *J. Assoc. Offic. Agr. Chemists 36,* 632-644 (1953).

44. Jacob, K. D., Magness, R. M., and Whittaker, C. W. Report on Phosphoric Acid in Fertilizers: Comparison of Neutral Ammonium Citrate and Two Per Cent Citric Acid Solutions as Solvents for Alpha Phosphate and Phosphate Rock–Magnesium Silicate Glass. *J. Assoc. Offic. Agr. Chemists 33,* 234-260 (1950).

45. Kumagai, R., Rapp, H. F., and Hardesty, J. O. Superphosphate Ammoniation: Physical Factors Influencing Ammonia Absorption by Superphosphates. *J. Agr. and Food Chem. 2,* 25-30 (1954).

46. Magness, R. M., and Hardesty, J. O. Particle Size and Composition of Particle-Size Fractions of Some Granular Mixed Fertilizers in 1953. *Assoc. Am. Fertilizer Control Officials Offic. Pub. 7,* 59-67 (1953).

47. Marshall, H. L., and Hill, W. L. Composition and Properties of Superphosphate: Effect of Aluminum and Iron Content on Curing Behavior. *Ind. Eng. Chem. 44,* 1537-1540 (1952).

48. Mehring, A. L. Unpublished Data.

49. Mehring, A. L. Fertilizer Expenditures in Relation to Farm Income. *Better Crops with Plant Food 28,* No. 8, 10-16, 47-48 (1944).

50. Mehring, A. L. The Problem of Filler in Fertilizers. *Am. Fertilizer 106,* No. 10, 7-10, 26, 28, 30 (1947).

51. Mehring, A. L. Consumption and Composition of Tobacco Fertilizers. *Agron. J. 41,* 240-246 (1949).

52. Mehring, A. L. Higher Analysis Fertilizer Grades. *Assoc. Am. Fertilizer Control Officials Offic. Pub. 3,* 37-50 (1949).

53. Mehring, A. L. Combination Fertilizers and Pesticides. *Com. Fertilizer 82,* No. 1, 32-40 (1951).

54. Mehring, A. L., and Bennett, G. A. Price Relationships of Certain Nitrogen Fertilizer Materials. *Agr. Chemicals 6,* No. 2, 47, 49, 51, 81; No. 3, 49, 51, 121 (1951).

55. Mehring, A. L., Bennett, G. A., and Adams, J. R. Fertilizer Expenditures in Relation to Farm Income in Various States. *Plant Food J. 6,* No. 4, 2-3, 8-10 (1952).

56. Mehring, A. L., and Vincent, G. P. Fertilizer Consumption in 1941 and Trends in Usage. *U. S. Dept. Agr. Circ. 689,* 55 pp. (1943).

57. Miller, E. V., and Jacob, K. D. Agronomic Value of Alkylation-Acid Superphosphate as Indicated by Greenhouse and Laboratory Experiments. *J. Am. Soc. Agron. 36,* 274-280 (1944).

58. Parker, F. W. Flue-Cured Tobacco Fertilizers of the Future. *Com. Fertilizer 84,* No. 3 32-34, 36-37, 40 (1952).

59. Rader, L. F., Jr., Reynolds, D. S., and Jacob, K. D. Effect of Picric Acid in Superphosphate on Tomatoes and Beans as Indicated by Greenhouse Experiments. *J. Am. Soc. Agron. 36,* 544-541 (1944).

60. Ross, W. H., and Mehring, A. L. Plant Food Concentration as a Factor in the Retail Prices of Fertilizers. *Ind. Eng. Chem., News Ed. 12,* 430-432 (1934).

61. Scholl, W., and Wallace, H. M. U. S. D. A. Reports 1947-'48 Non-Farm Consumption of Fertilizers. *Agr. Chemicals 5,* No. 2, 24-27, 93 (1950).

62. Scholl, W., and Wallace, H. M. Composition of N-P-K- Mixed Fertilizers in Relation to Guarantee. *Assoc. Am. Fertilizer Control Officials Offic. Pub. 4* 33-49 (1950).

63. Scholl, W., and Wallace, H. M. Commercial Fertilizer Consumption in the United States, 1949-50. *Com. Fertilizer 82,* No. 6, 20-22, 24-25, 27, 28 (1951).

64. Scholl, W., and Wallace, H. M. Commercial Fertilizer Consumption in the United States, 1950-51. *Com. Fertilizer 84,* No. 6, 20-21, 24-25, 28-29, 34, 36, 40-41 (1952).

65. Scholl, W., and Wallace, H. M. Commercial Fertilizer Consumption in the United States, 1951-52. *Com. Fertilizer 86,* No. 6, 20-22, 24-25, 28-29, 32-33 (1953).

66. Scholl, W., Wallace, H. M., and Fox, E. I. Preliminary Report on Commercial Fertilizer Consumption for the Year Ended June 30, 1953. *Com. Fertilizer 88,* No. 2, 22-23 (1954).

67. Schollenberger, C. J., and Whittaker, C. W. The Ammonium Chloride-Liming Materials Reaction. *J. Assoc. Offic. Agr. Chemists 36,* 1130-1146 (1953).

68. Smith, D. H., Blume, J. M., and Whittaker, C. W. Liming Materials in Soils: Radiochemical Measurement of Reaction Rates. *J. Agr. and Food Chem. 1,* 67-70 (1953).

69. Starostka, R. W., and Armiger, W. H. Unpublished Data.

70. Yates, L. D., Nielsson, F. T., Fox, E. J., and Magness, R. M. Enriched and Concentrated Superphosphates. *Ind. Eng. Chem. 45,* 681-690 (1953).

MARKETS

Interest in fertilizer organics is rather spotty with occasional sales of domestic Nitrogenous and Imported Nitrogenous although producers of domestic Nitrogenous continue in a well sold position and offerings of Imported material are light. Domestic Nitrogenous Tankage varies in price from $3.50 to $4.50 per unit of Ammonia, bulk, f.o.b. production points. Imported Nitrogenous is indicated around $4.15 per unit Ammonia, in bags, CIF Atlantic ports.

CASTOR POMACE: Domestic production is indicated at $25.00/$24.00 per ton, in bags, f.o.b. Northeastern production points. This is guaranteed minimum 6.75% Ammonia. Texas and Oklahoma Castor Pomace, usually guaranteed minimum 6.25% Ammonia, is currently offered at around $14.50 per ton bulk to $15.00 per ton bagged, f.o.b. Texas or Oklahoma production points.

DRIED BLOOD: This market is rather firm at around $8.25 to $8.50 for unground bagged Blood at Chicago and the New York market is in practically a sold up position. Interest is primarily from the feed trade.

POTASH: Movement of Muriate of Potash from domestic sources against contracts continues to improve in volume and supplies of Sulphate of Potash are somewhat below demand. Limited supplies of Imported Sulphate of Potash and Muriate of Potash are arriving over the next couple of months at Atlantic ports.

GROUND COTTON BUR ASH: Supplies of this form of Potash, composed primarily of Carbonate of Potash, continue available for prompt and future shipment and analysis now runs about 33% to 37% K_2O. Prices are unchanged and approximating the cost of Domestic Sulphate of Potash delivered at most destinations.

PHOSPHATE ROCK: Stocks above ground are in very comfortable position and movement against

Farmers depend on ARMOUR FERTILIZERS

For more than 50 years Armour fertilizers have been "making every acre do its best". Farmers know that Armour's highest-quality fertilizers are made right and cured right to give best results with all crops.

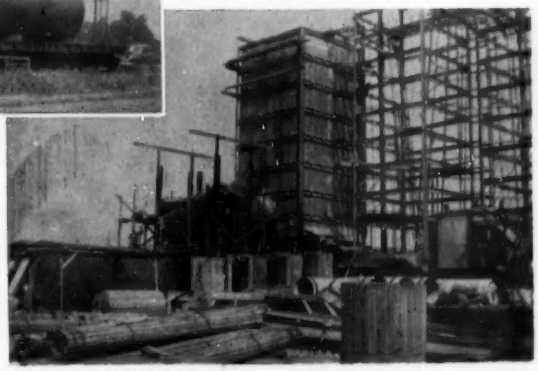
Every bag of fertilizer sold by Armour is backed by years of painstaking scientific research in the fields of chemistry and farming. Testimonials from every section of the country—on all types of crops—prove that Armour fertilizers make increased yields of better quality crops that bring higher profits.

ARMOUR FERTILIZER WORKS
General Office
P.O. Box 1685
Atlanta 1, Georgia

31 FACTORIES CONVENIENTLY LOCATED TO SERVE YOU

Albany, Ga.
Atlanta, Ga.
Augusta, Ga.
Baltimore, Md.
Bartow, Fla.
Birmingham, Ala.
Carteret, N.J.
Chicago Heights, Ill.
Cincinnati, Ohio
Columbia, S.C.
Columbus, Ga.
Dallas, Texas
E. St. Louis, Mo.
Greensboro, N.C.
Houston, Texas
Jacksonville, Fla.
Jeffersonville, Ind.
Memphis, Tenn.
Montgomery, Ala.
N. Kansas City, Mo.
Nashville, Tenn.
New Orleans, La.
Norfolk, Va.
Presque Isle, Me.
Sandusky, Ohio
Siglo, Tenn.
Waterloo, Iowa
Wilmington, N.C.
Winona, Minn.

Also sales offices in Havana, Cuba, and San Juan, Puerto Rico



. . . Lead Lined Equipment or Construction of Complete Acid Plants

SOUTHERN LEAD BURNING COMPANY

P. O. Box 4627 ATLANTA 2, GEORGIA Tel. Walnut 2576

*With its 17,000,000 acres of scientifically tree-farmed woodlands—twenty huge pulp, paper and board mills—another twenty converting plants devoted exclusively to products for modern packaging... with these, the International Paper Company and its affiliated companies serve as a vast reservoir of raw materials, facilities and "know-how" for the quality production of Bagpak Multiwall Paper Shipping Bags.

Bagpak also furnishes Bag Closing Machines. For details about bags and machines write to Bagpak Division, International Paper Company, 220 East 42nd St., New York 17, Dept. C-8

International Paper COMPANY

BAGPAK DIVISION

BRANCH OFFICES: Atlanta • Baltimore • Baxter Springs, Kansas • Boston • Chicago • Cleveland • Denver • Detroit • Kansas City, Kansas • Los Angeles • New Orleans • Philadelphia • Pittsburgh • St. Louis • San Francisco • IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto

One-Stop NITROGEN Service For Fertilizer Manufacturers

LION

Nitrogen

FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

LION AQUA AMMONIA—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

LION AMMONIUM NITRATE FERTILIZER—For direct application or formulation. Improved spherical pellets. Guaranteed 33.5% nitrogen.

LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

TECHNICAL SERVICE—Lion provides special technical assistance for fertilizer manufacturers. Write to CHEMICAL SALES DIVISION for quick service.

LION OIL COMPANY

EL DORADO, ARKANSAS

domestic commitments is improving.

SUPERPHOSPHATE: Shipments of normal Superphosphate to mixers are gaining and approaching proportions of this time last season. Prices remain stable.

AMMONIUM NITRATE: Demand for all types of 33½% Ammonium Nitrate continues in excess of supply. Prices remain firm and unchanged.

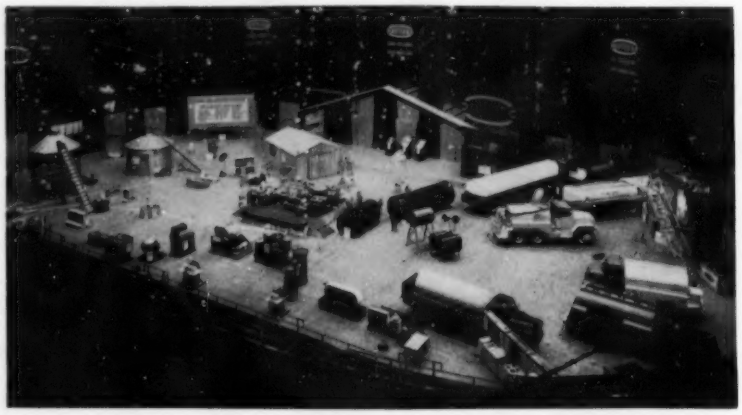
SULPHATE OF AMMONIA: Stocks continue adequate against quite heavy demands. Prices remain steady.

NITRATE OF SODA: Movement of supplies from stock points are expanding in the southeast and prices remain unchanged.

CALCIUM AMMONIUM NITRATE: Several brands of this 20½% Nitrogen material continue available at several Atlantic and Gulf ports at $51.25 per ton, bagged, f.o.b. cars at the ports.

GENERAL: Movement of mixed goods throughout the southeast and midwest continues behind normal dimensions but demand for direct application forms of Nitrogen is expanding. Most manufacturers still have large inventories of mixed fertilizers available for this season's demand.

BUTLER PUTS ON PRODUCTS SHOW



This is a panoramic view of the main arena of Kansas City's Municipal Auditorium just before the "Butler Product Revue," professional production to make the 160 salesmen in specialized lines familiar with all the Butler lines in looking toward tie-in sales. Product groupings clockwise from the steel buildings in the background are oil tank trucks, trailers and storage tanks; L-P gas truck and home equipment; dry cleaning equipment; farm equipment; and special products which include the new metal billboard panels.

STEDMAN

FERTILIZER PLANT EQUIPMENT

Established in 1834

All Steel Self-Contained Fertilizer Mixing and Bagging Units

Batch Mixers — Dry Batching

Pan Mixers — Wet Mixing

Tailings Pulverizers — Swing Hammer and Cage Type

Dust Weigh Hoppers

Vibrating Screens

Acid Weigh Scales

Belt Conveyors — Stationary and Shuttle Types

Batching Hoppers

Bucket Elevators

Hoppers and Chutes

STEDMAN FOUNDRY & MACHINE COMPANY, INC.

Subsidiary of United Engineering and Foundry Company

General Office & Works: AURORA, INDIANA

Now more farmers know the value of high-nitrogen fertilizers

Make sure your dealers have plenty of 8-8-8 and 10-10-10 to meet increased demand

DURING the past few months United States Steel ads in national farm publications, with a combined total circulation of over a million and a half, have been promoting high-nitrogen fertilizers. These ads tell the farmers how *nitrogen* has helped raise yields, increase profits and safeguard crops against drought.

This promotional campaign has stimulated great interest in nitrogen. Farmers feel it's certainly worth trying for themselves. You can take advantage of this active interest by making sure that your dealers have plenty of 8-8-8 and 10-10-10 and that these fertilizers contain dependable, top quality nitrogen.

That means *USS Ammonium Sulphate.* Mixers, dealers and farmers alike are finding that it does mean "better nitrogen for better yields." Because USS Ammonium Sulphate is kiln-dried, it's free-running, is excellent for mixing. And it won't set up in storage. It's especially popular with farmers because its nitrogen won't leach out, but is always available as plants need it.

For complete information on USS Ammonium Sulphate, contact our nearest Coal Chemical sales office, or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS AMMONIUM SULPHATE USS

4-643

UNITED STATES STEEL

ALABAMA

Robertson Fertilizer, Clayton, is enlarging present structures, and adding new equipment.

ARIZONA

The Pacific Guano Co. of Los Angeles, is expanding its Arizona operations by construction of a large aqua ammonia conversion plant; cost was not revealed.

Joy Evans is general manager of state operations; **John M. Moulder** of Phoenix, liquid division head; and **John N. Ursch** credit manager. Sales representatives and assigned areas are: **Jack Taylor** and **Lloyd Norris,** Casa Grande; **Dick Burkland,** Gila Bend, Waddell and Buckeye; **Ray Adair,** Laveen; **Fred Corbus,** Scottsdale, Tempe and Mesa; **Tom Kunce,** Chandler and Queen Creek; **Paul Praveltoni,** Glendale and surrounding areas; **Ben Bush,** Eloy; and **William** and **Alton Skoug** and **George Glendening,** Tucson.

CALIFORNIA

Brea Chemicals, Brea, which is adding a nitric and ammonium nitrate plant, to cost about $2,500,000, adjacent to the $13,000,000 ammonia plant now under construction, has awarded the engineernig contract to **C. F. Braun & Co.,** according to word from **Homer Reed,** Brea's president. The ammonia plant is due to come into production next month, and most of its initial output will be marketed as aqu solution to the West, Hawaii and Mexico.

* * *

Karl Ahlswede planned a plant at Riverside. In his application he called it a "fertilizer factory." He promptly bumped into neighbor trouble and now—in withdrawing his application for zoning permit—admits that he should have called it a "chemical blending plant." The neighbors like Karl personally, and trust him and all that, but they just don't want that plant so near the University campus!

Bradley and Baker, New York, have established this operation as the seventh link in its chain of South Atlantic and Gulf Coast facilities for pier-side storage and packing of Nitrolime fertilizer. This one is located at Charleston, S. C. Others are at Norfolk, Wilmington, Savannah, Pensacola, Mobile and Gulfport. Conveyor belts carry fertilizer to warehouse storage area and a battery of packaging machines. Full bags are loaded direct to railroad cars on the pier siding.

FLORIDA

Trucklines applying for permits to haul phosphate, bumped into heavy neighbor trouble—motor court associations, chambers of commerce, school boards, county commissions. On the other hand, railroads and other truck lines object because they argue that no special permit is needed anyhow, and why set up a precedent?

* * *

American Agricultural Chemical, Pierce, is getting out of the real estate business. It has a community of employee tenants, to whom it is now offering to sell their homes, and move them to another location on lots near the plant which are offered at nominal cost.

* * *

Ridge Fertilizer, Lake Wales, are

SLICK CHICK

. . . and growing slicker every day. Fowl that is meatier and tastier than was thought possible even a generation ago, is being produced with the aid of feeds grown in well-fertilized soil. Potash, a component of many modern fertilizers, enriches the soil, improves crop quality, helps build resistance to disease, and increases product yield.

The potash produced by the United States Potash Company has two distinct advantages in the mixing of modern commercial fertilizers. It has the highest K_2O content, and is free-flowing and non-caking—important factors in fertilizer production.

As an investment in the soil, potash pays off handsomely in better crops and better business.

SUNSHINE STATE POTASH — PRODUCT OF NEW MEXICO U.S.A.

REG. U. S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.

UNITED STATES POTASH COMPANY INCORPORATED

30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Sackett Builds The Equipment You Need

★ ONE MAN BATCH WEIGH SYSTEMS

★ PLANT MODERNIZATION PROGRAMS

★ CONTINUOUS AMMONIATION UNITS

★ MIXING AND SHIPPING EQUIPMENT

Aerating Equipment
Automatic Control Equipment
Basing Units
Belt Conveyors
Bucket Elevators
Centralized Control Systems
Continuous Acidulating Processes
Continuous Ammoniating Systems
Conveyors
Coolers
Crushers
Disintegrators
Dry-Mixing Units
Dust-Arresting Equipment
Fume Scrubbing Systems
Hoppers and Spouts
Materials Handling Equipment
Milling and Screening Units
Multiple Hopper Batching Systems
Oil Fired Dryers
Plant Mechanization Systems
Pneumatically-Operated Gravity Batch Mixers
Pneumatically-Controlled Valves
Pulverizers
Sackett Timken Bearings
Sacking Units
Scales
Screens
Shipping Units
Shuttle Belt Conveying Systems
Tailing Mills
Vacuum Condensing Systems

GET THE RIGHT ANSWER TO YOUR PRODUCTION PROBLEMS *get Sackett*

SACKETT

THE A. J. SACKETT & SONS CO.
1727 S. HIGHLAND AVENUE
BALTIMORE 24, MARYLAND

planning a $36,000 building program, which will increase production facilities 50%, according to **M. C. Dopler,** president. Ridge have been in business 8 years.

* * *

Liberty Fertilizer, Red Springs, North Carolina, recently staged a demonstration in Marion County to show how Florida pastures can be fed liquid nitrogen from airplanes and tractor application equipment.

* * *

Hudson Pulp & Paper Corp. recently let the contract for conversion of a building at its Palatka plant.

IDAHO

Sullivan Mining Company, Kellogg, expects to be in production by next month with its new sulphuric acid plant, recovering the acid from waste gases produced in their zinc smelting operation. **General Chemical Division, Allied Chemical & Dye** is reported as sales agent for the output, which is expected to reach 250 daily tons.

ILLINOIS

Chicago Stockyards Composting Co., the brainchild of the head man of the Stockyards, has developed a technique of measuring composting and has accomplished in 4 days what it took months to do with stockyard waste. It has tested combinations with garbage but is not likely to pursue these because the cost of using the garbage is out of line with straight yard waste. Their plant will turn out only 3,500 annual tons, but is expected to grow to about 50,000 annual tons.

* * *

M. W. Kellogg, New York are to build a $7,000,000 ammonia plant adjacent to the **Petro Chemicals Corporation** plant at Tuscola, and near the **U.S. Industrial Chemicals Corporation** plant there.

* * *

Meiners Soil Service, Colfax, held a formal opening February 23 of their new mixing plant, and invited the public to inspect. **Dr. R. H. Bray,** University of Illinois professor of soil fertility spoke on the best methods of improving yields with fertilizers. Tours through the plant and the soil testing laboratories were included, under the direction of **Paul Orr,** who is in charge of the testing program.

LOUISIANA

Plantation Anhydrous Ammonia Corporation, Houma, has filed to change its name to **Plantation Fertilizers Corporation.**

MINNESOTA

University of Minnesota is organizing research teams to study the plentiful peat bogs of that region to find ways to extract humic acids, for use in soil conditioners and fertilizer with **Dean A. F. Sphilhaus** of the Institute of Technology heading up the work.

MISSOURI

LaPlata Chemical Co. went into operation early last month with its new 75 by 150 foot plant at La Plata, managed by **H. Larry Beckman,** a chemical engineer of 15 years experience, who designed and built the plant for its local owners.

* * *

The Army and **American Cyanamid** are reported in negotiation over the leasing by Cyanamid of the Missouri Ordnance Works at Louisiana, Mo. We understand the Cyanamid offer was $13.23 per ton of produced ammonia and the lease would be for 6 years with two 6-year renewal options, plus the right to buy at $3,325,000.

MISSISSIPPI

Spencer Chemical started turning out 220 daily tons last month from its new $14,000,000 ammonia plant at Vicksburg.

* * *

Mississippi Federated Cooperatives last month went into production with its Meridian plant after a three-month remodeling program.

NEW YORK

Soil & Plant Foods, Inc., mentioned in our December issue as having been chartered is located at 80 Wall Street, New York City, and has announced a new conditioner-fertilizer combination called "Bantus." It contains mineral earth high in humus and essential trace min-

THE SACKETT PLANT PACKAGE

FOR OVER 50 YEARS WE HAVE SERVED **ONLY** THE FERTILIZER INDUSTRY.

FOR 15 WE HAVE BUILT **COMPLETE** DRY MIXING AND SUPERPHOSPHATE PLANTS.

THIS IS WHAT WE MEAN BY COMPLETE.

1 Property Selection

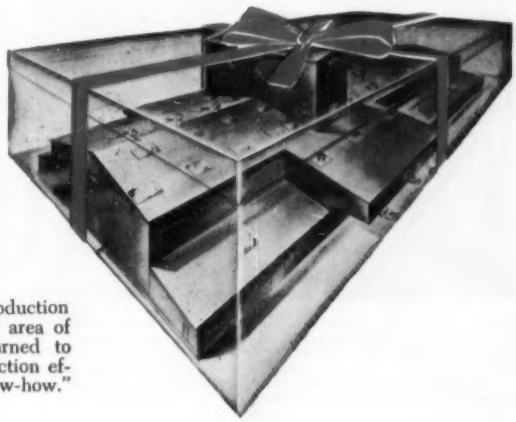
We assist you in the important matter of site selection for your new plant including determination of subsoil conditions.

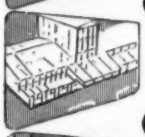
2 Plant Investment

We tell you before the contract is signed exactly how much the plant will cost. We protect you against unknown "cost plus" work.

3 Plant Design

We *custom-design* the building and all production equipment to meet the particular needs of your area of distribution. Further, we leave no stone unturned to incorporate the highest possible degree of production efficiency based on our wealth of specialized "know-how."





4 Building Construction

We construct the building from foundations to roof using the best materials obtainable in each component part. We include all electric power and lighting required including a power room, in which are located all motor controls for protection against usual dust and moisture conditions.

5 Equipment Manufacture

We fabricate in our own shops production equipment of the very latest design. Upon arrival at the site, we install this equipment with highly skilled men under the supervision of thoroughly competent field engineers. Upon completion of this work, each component part is thoroughly tested prior to the plant's initial operation.

6 Guaranteed Performance

We guarantee the operating performance of the complete project both from a standpoint of hourly capacities as well as manufacturing costs covering each operational phase involved. In most every case, these guarantees are exceeded by a safe margin. Should deficiencies develop, prompt corrective measures are taken at our expense.

7 Training of Personnel

After its initial startup, our Operations Engineer remains at your plant to thoroughly train your key production personnel.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernizatin programs. It is available at no cost.

SACKETT
BALTIMORE

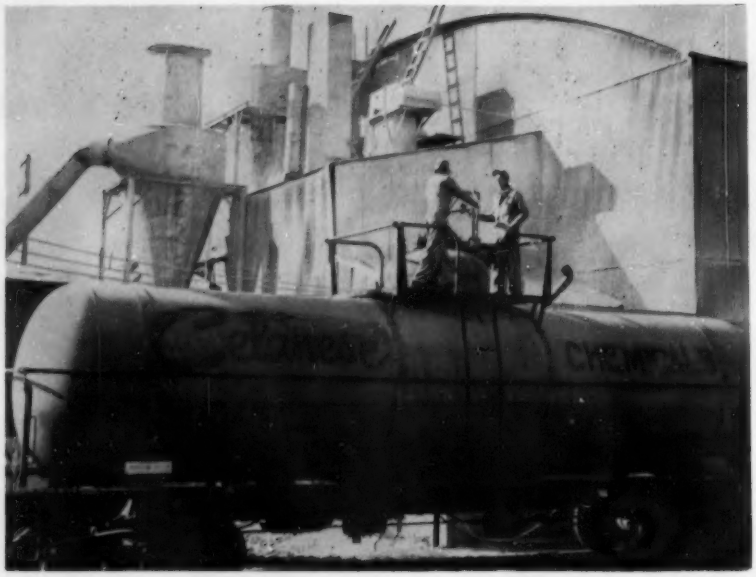
America's Foremost Designers and Builders..

SUPERPHOSPHATE PLANTS · FERTILIZER MIXING PLANTS

RELATED PRODUCTION EQUIPMENT

THE A. J. SACKETT & SONS CO.,
1727 S. HIGHLAND AVENUE, BALTIMORE 24, MD.

Architects and Manufacturing Engineers to the Fertilizer Industry since 1897



Blue Valley Fertilizer Co., Inc., at Marysville, Kans., claims to be the only plant in the country using a process which employs Celanese chemicals to put a refined smooth finish on their final granulated fertilizer. (?!!) This picture, with a portion of the plant dust collectors and granulating unit in the background, shows workmen discharging one of the 50 cars which the Nitrogen Division, Allied Chemical & Dye Corporation, has leased to help in the movement of nitrogen solutions during the spring rush season.

erals, is combined with tankage and then added to a standard analysis. It is being marketed in 1, 2 and 5 pound packages and bags from 25 to 80 pounds.

* * *

Fairfax Biological Laboratory, Clinton Corners, has acquired Doom Insecticides, via purchase of their makers, **Edgar A. Murray Co.,** Detroit.

NORTH DAKOTA

State Research Foundation director, **Alex C. Burr,** has completed a detailed study of commercial fertilizer production potentials in North Dakota and reports it as "the greatest non-competitive market for fertilizers in the nation" and justifies the establishment of a synthetic nitrogen plant in the Western portion of the State.

OHIO

Jaite Co. has changed its name to **National Container Corp. of Ohio,** it was announced by **Multiwall Bag Division of National Container Corp.** In addition to the original plant at Jaite, Ohio, the firm has recently acquired and now operates a multiwall bag plant at Kansas City, Mo.

OKLAHOMA

Nichols Seed Company, Oklahoma City, write that they have purchased the machinery and stock of a pesticide plant formerly located in their city. **Earl Nichols** tells us it is being dismantled and moved to Jones where it will be operated in conjunction with the new fertilizer plant under construction, which will have a capacity of 100 daily tons.

Nichols have been fertilizer distributors. The purchase of the pesticide plant rounds out a $100,000 expansion program.

* * *

Monarch Fertilizer, Muskogee, has done a good job in its year of existence. As the town puts it, they have grown from a six by eight foot office to a plant that buys half the rock phosphate used in their state—enough to bury the original office many times. **K. A. Schmitt** operates the concern.

SOUTH CAROLINA

Port of Charleston last month began use of its new bagging equipment, sacking a half million dollars worth of fertilizer material consigned to **Bradley and Baker,** whose Nitrolime has heretofore arrived already sacked.

TEXAS

Swift & Co. have put in operation their new plant-food division plant at Houston—46,200 square feet of floor space and most modern equipment. It is geared especially to expedite truck loading for regional application operations. **S. B. Tatem** is manager.

* * *

Freeport Sulphur is in operation at its new sulphur mine at Nash dome, near Houston, one of four they are in process of developing.

* * *

Mathieson Chemical have begun construction of a combination fume scrubber and burner installation at their Pasadena fertilizer plant—the result of many months of effort to eliminate odors. **John R. Beatty** Houston operations manager says the cost will be about $200,000 and should be complete by next month.

* * *

Texas City Chemicals, Incorporated, is now operating a production unit to recover uranium concentrate as a by-product in its new phosphate products plant at Texas City, Texas it was announced February 6 by the **Atomic Energy Commission.**

The unit was designed to recover uranium concentrates as a by-product of feed grade dicalcium phosphate and fertilizer grade dicalcium phosphate derived from Florida phosphate rock containing minor quantities of uranium.

The unit is owned and operated by Texas City Chemicals, which has a contract to supply uranium concentrate to the U. S. Atomic Energy Commission.

As our readers know, the Commission has been sponsoring research and process development studies for the recovery of uranium from domestic sources such as the very extensive phosphate deposits and reserves occurring in Florida and several Western states.

The first commercial unit for recovery of uranium from phosphate rock has been operated continuously since September 1952, by the **Blockson Chemical Company** near Joliet, Illinois, where uranium is recovered as a by-product of sodium phosphate chemicals.

DRIBBLING IN BASKETBALL IS *OK* . . .

BUT NOT IN A FERTILIZER PLANT

• A good dribbler may be worth his weight in gold . . . in basketball, but in your plant, dribbling expensive granular fines through poor fitting bucket lips can result in costly contamination.

Blaw-Knox Chemical and Fertilizer Buckets are designed with *tight-fitting* lips to prevent leakage. They stop the dribbling away of your profits. These cast alloy steel lips also resist abrasion and prolong bucket life.

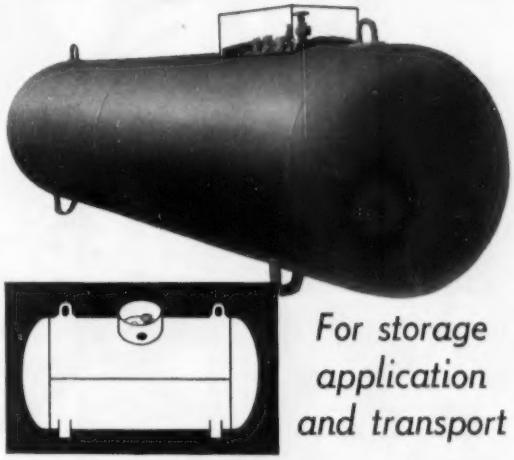
For a detailed description of the important features in Blaw-Knox Buckets, write for Bulletin 2378 today.

BLAW-KNOX

BLAW-KNOX COMPANY
Blaw-Knox Equipment Division
Pittsburgh 38, Pa.
Offices in Principal Cities

BLAW-KNOX FERTILIZER BUCKETS

CHARLOTTE
DUO-TESTED
Anhydrous Ammonia Tanks



For storage application and transport

Charlotte Anhydrous Ammonia Tanks are of all-steel welded construction — 265-lb. design working pressure, UW-52, ASME Code.

Standard sizes 300, 500 and 1,000 gallon capacities for storage. 100 and 150 gallon capacity applicator tanks.

Skid and truck tanks also available.

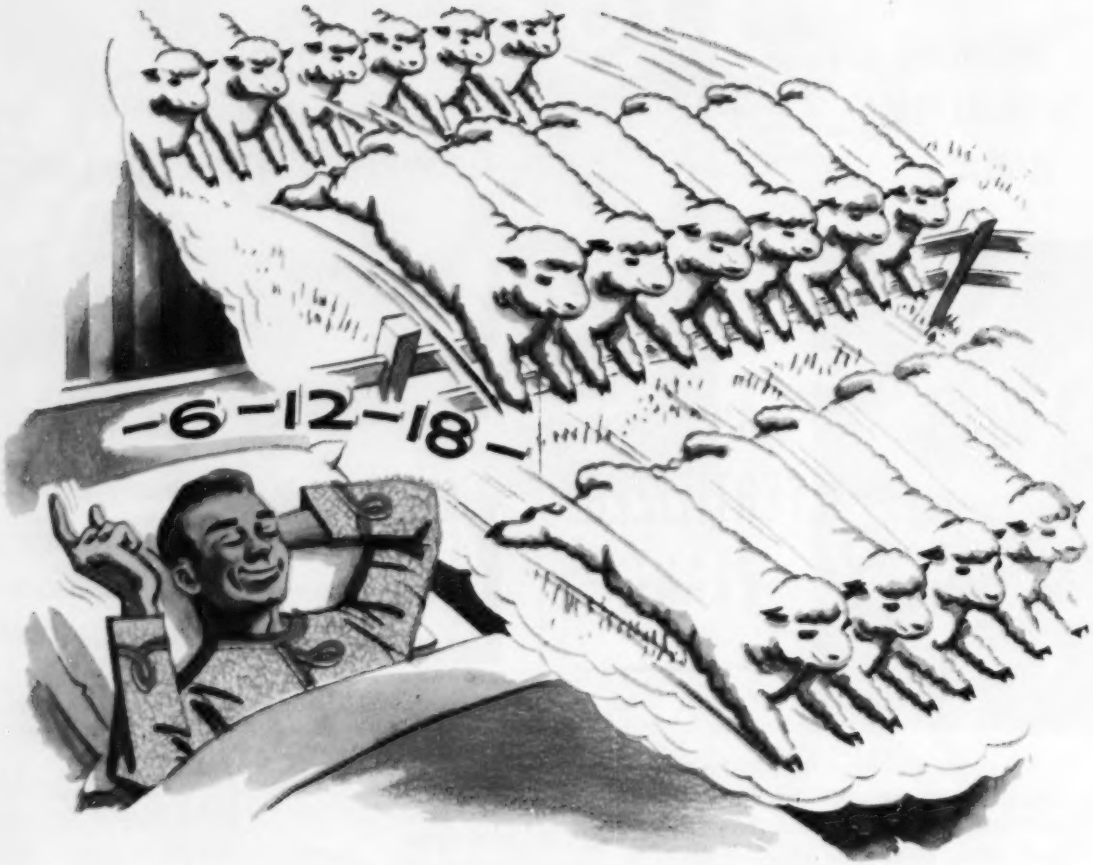
All fittings steel.

GUARANTEED
to be constructed in accordance with ASME Code.

CERTIFIED
to be hydrostatically tested to 1½ times design working pressure. Air tested to 100-lb. after fittings are installed.

Write today for full details and prices.

CHARLOTTE TANK CORPORATION
Post Office Box 8037
CHARLOTTE 8, NORTH CAROLINA



Get Through Quicker!

Use **Tennessee's SUL-FON-ATE AA 9** and reduce curing time. Increase turnover and tonnage while maintaining top quality.

Use **Tennessee's SUPER ACID** for fast Superphosphate curing.

Technical service is available to help you with your problems.

ORGANIC CHEMICALS DIVISION

TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

INGENUITY

FULTON MAKES YOUR STYLE MULTIWALL PAPER BAGS

The men who operate the intricate machines that make Fulton Multiwalls have had years of experience in manufacturing paper bags. Their skill and watchfulness is shown in the uniform high quality and functional designs of all Multiwall Paper Bags. Whatever your Multiwall requirements are—try Fulton on your next order. Speedy, coast-to-coast delivery from our plants in St. Louis, New Orleans and Los Angeles.

Fulton
BAG & COTTON MILLS

ATLANTA • NEW ORLEANS • DALLAS • ST. LOUIS • DENVER • LOS ANGELES • KANSAS CITY, KANS.
MINNEAPOLIS • NEW YORK CITY • WINTER HAVEN, FLA. • SAN FRANCISCO • PHOENIX
SAVANNAH

Consult

BAMAG

for the construction of MODERN EFFICIENT:

•
•
•

—Nitric Acid Plants

—Ammonium Nitrate Plants (crystals, prills or solution)

—Lime Ammonium Nitrate plants

—Ammonium Sulfate plants

—Other Nitrogen Fertilizers plants

•
•
•

Bamag's know-how and long experience are available through:

BAMAG

GENERAL INDUSTRIAL DEVELOPMENT CORPORATION

270 PARK AVENUE, NEW YORK 17, N. Y.

Alex. M. McIver & Son

BROKERS

Specializing

SULPHURIC ACID

Ground Cotton Bur Ash, 38/42% K_2O Potash.

Nitrogenous Materials

Castor Pomace

Phosphate Rock

"Riceland" Ground Rice Hulls

Representatives

Morgan Brothers Bag Company, Inc.

Bags—Paper and Textile

Ammoniated Base and Superphosphate

Dolomitic Lime

(42-44% Magnesium Carbonate)

POTASH

PEOPLES OFFICE BUILDING

Charleston, South Carolina

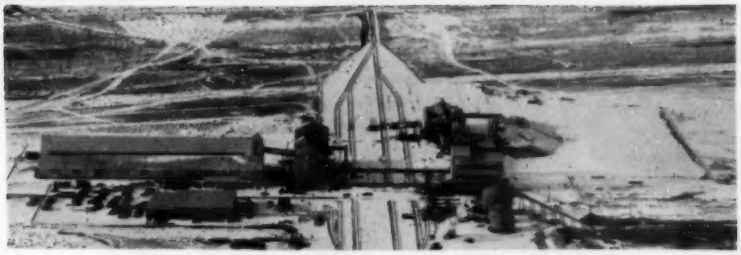
Phones: Local 3-3436—3-3437—LD 921-922

The Sanitary District of Chicago

Chicago, Ill.

Nitrogenous Organic For Sale

Annual output of Nitrogenous Organic material, (Chiorganite) (Illorganite) estimated at 150,000 tons. Minimum contract period one year beginning July 1, 1954. You may purchase entire output or in lots of 10%. For forms **necessary** for bidding or for further information address: Harry E. Eaton, Clerk of the Board, The Sanitary District of Chicago, 910 South Michigan Ave., Chicago 5, Illinois. Bids will close March 25, 1954.



Panoramic view of the new $5,000,000 plant of Western Phosphates, Garfield, Utah, whose progress and recent opening have been recorded here from month to month. Annual production is 90,000 tons.
Bulk storage building, left center, with employee parking area and laboratory, office, shop and stores buildings immediately in front.
Treble Superphosphate and "11-48" Ammonium Phosphate manufacturing building, next right.
Pipe bridge running across tracks to Prayon filter building (right center) with potable water storage tank and H_2SO_4 storage tanks (2) successively in front. Note pipe bridge conveying gypsum disposal pipeline from corner of filter building to disposal pond, lower right corner. A portion of disposal pond dike shows as white vertical line running from bottom right to center right.
Beneficiated ore storage and Raymond mill buildings are directly in back of filter building. Note conveyor bridge to phosphate rock reserve storage pile on storage area immediately to right of these buildings.

Other processors of phosphate rock, as has been reported here, are installing in their existing production lines special units to recover by-product uranium concentrate and more installations of this kind are expected to be made in the near future.

WASHINGTON

Stauffer are producing Ammonium Phosphate-Sulphate at their new plant at Tacoma. They tell us it might be compared with ammoniated superphosphate but contains more nitrogen and does not suffer the reduction in water soluble phosphoric acid content which occurs when single superphosphate is ammoniated, yet about 90% of the available phosphoric in their product is water soluble. The product is pelletized, and requires no curing, hence calls for less storage facilities, and more efficient scheduling. They use the Italian Rumianca process for which Stauffer has exclusive rights to use and to sub-license in this country.

BRAZIL

Fertisa, fertilizer industry being organized in Minas Gerais, is having a series of industrial scale tests made by German technicians from the **Luargi Engineering** group on their furnaces. Meanwhile, the Governor having plead the utmost urgency, the Araxa plant construction is being speeded up.

* * *

Ministry of Agriculture is studying impurities in Brazilian coal in the hope that sulphur can be obtained from it.

CANADA

Dow Chemical of Canada is planning expanded ammonia facilities that provide more than 100 daily tons. The project, which is to cost in excess of $3,000,000 is slated for completion within a year.

EGYPT

Ministry of Finance has completed plans for the Aswan fertilizer plant, to cost $18,000,000 to begin with, and expansion provided that will run it up to a possible $75,000,000. They figure the plant will save Egyptians some $15,000,000 annually by eliminating imports.

* * *

Kafr El-Zayat, now producing some 700 annual tons of DDT, is being expanded, as are other pesticide producers, so that by late Spring the nation will be producing enough DDT to supply half its need.

INDIA

Pakistan has begun construction of the ammonium sulfate plant, which with a cement plant is to rise at Daudkhel. It is figured for 50,000 annual tons, and for completion by early 1956. Cost, $12,000,000 —participated in by both U.S. and Canadian money.

ISRAEL

Dead Sea Potash, Sodom is now producing its 125 daily tons of potash, and moving now toward 400 daily tons, expected to be reached by June.

JAPAN

Shin Nippon Chisso Hiryo K. K. are having a plant built at Minimata to produce phosphoric acid and ammonium phosphate. **The Dorr Co.** is the designer. They designed and built a similar plant in Korea for the same concern 25 years ago.

* * *

Japanese Sulphur Industry, dormant during the War, is now back almost to pre-War levels.

KOREA

Office of Planning is insisting on a 300,000 annual ton ammonium nitrate plant near Puk Pyong, because of the rapidly growing consumption of fertilizers in Korea. The problem of sufficient electric power, pointed out by the UN Korea group, may be taken care of by the engineering study being submitted by **Chemical Construction Corporation.** As the cost is reported around $40,000,000, there may also be some problem of financing, with political sidelights to the problem which must also be clarified.

MEXICO

The American Society of Mechanical Engineers, meeting this month in Mexico City, will include as part of their program a trip through the facilities of **Guanos y Fertilizantes, S. A.** This plant, as has been previously reported here produces ammonium sulphate, phosphates, sulphuric acid, fertilizers and other chemical products.

NETHERLANDS

Norsk Hydro and **N. V. Maatschappij tot Exploitatie van Kooksovengassen** are testing out at Ijmuiden, near Amsterdam, a harnessing of the heavy tidal flow of the sea to turn out potassium nitrate. The Norduco process recovers from sea water, which contains only about 450 kilos of potash per 1000 cubic meters and pumping would be impractical. A pilot plant is in the planning stage to find out if this is economically sound. The Netherlands now import some 200,000 annual tons of potassium nitrate. Norsk Hydro's chief chemical engineer, **Jacob Kielland,** originated the process, which has been developed by a corporation set up for the purpose, **A/S Norduco.** If successful, plants will be erected not only in the Netherlands, but in Norway as well, and other countries may be licensed

the ST. GOBAIN process for the manufacture of granulated complex fertilizers is flexible!

So flexible, that one St. Gobain unit can produce practically any desired nitrogen-phosphorous-potash formulae, *without altering the equipment.* Shown below are just seven of the possible formulae produced by the St. Gobain Process.

Examine the simplicity of the flow diagram and you will understand why the capital investment is so low. Continuous automatic operation of the St. Gobain Process with its unusually high yields mean low operating costs with considerable savings in power consumption, maintenance and labor requirements.

In addition to the great flexibility and the simplification of the equipment, St. Gobain offers the following advantages:

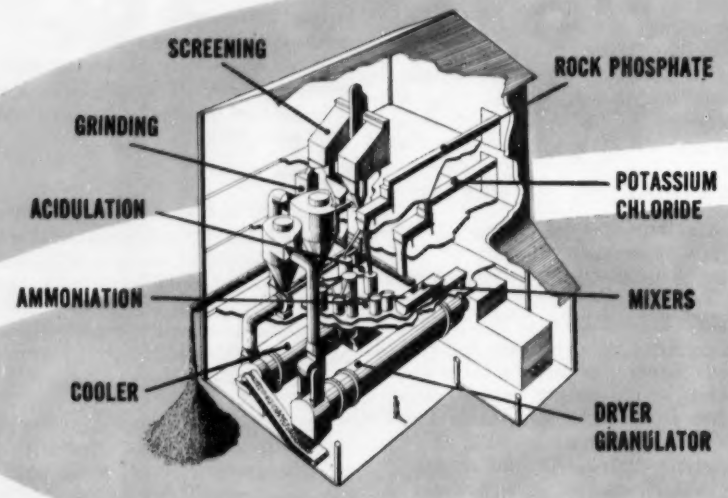
Phosphate rock grinding is unnecessary.

A very high nitrogen yield of 98:100.

Non-hygroscopity of the fertilizers due to the absence of lime nitrate.

Can produce end product in any sized granules desired.

St. Gobain process has been in successful industrial operation for 11 years.

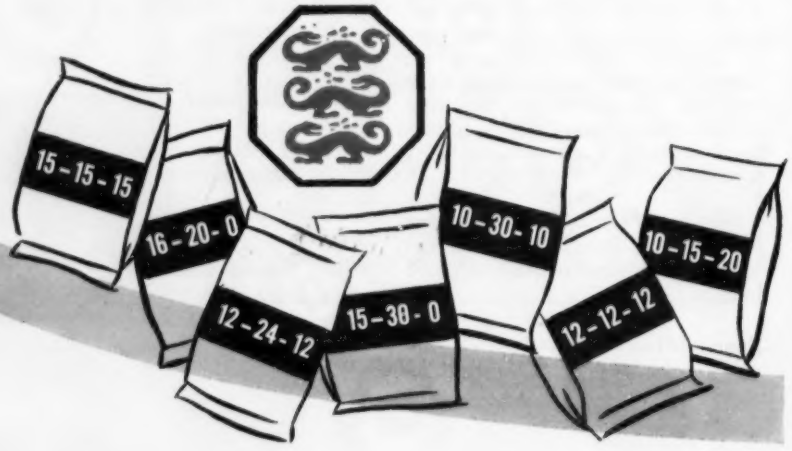


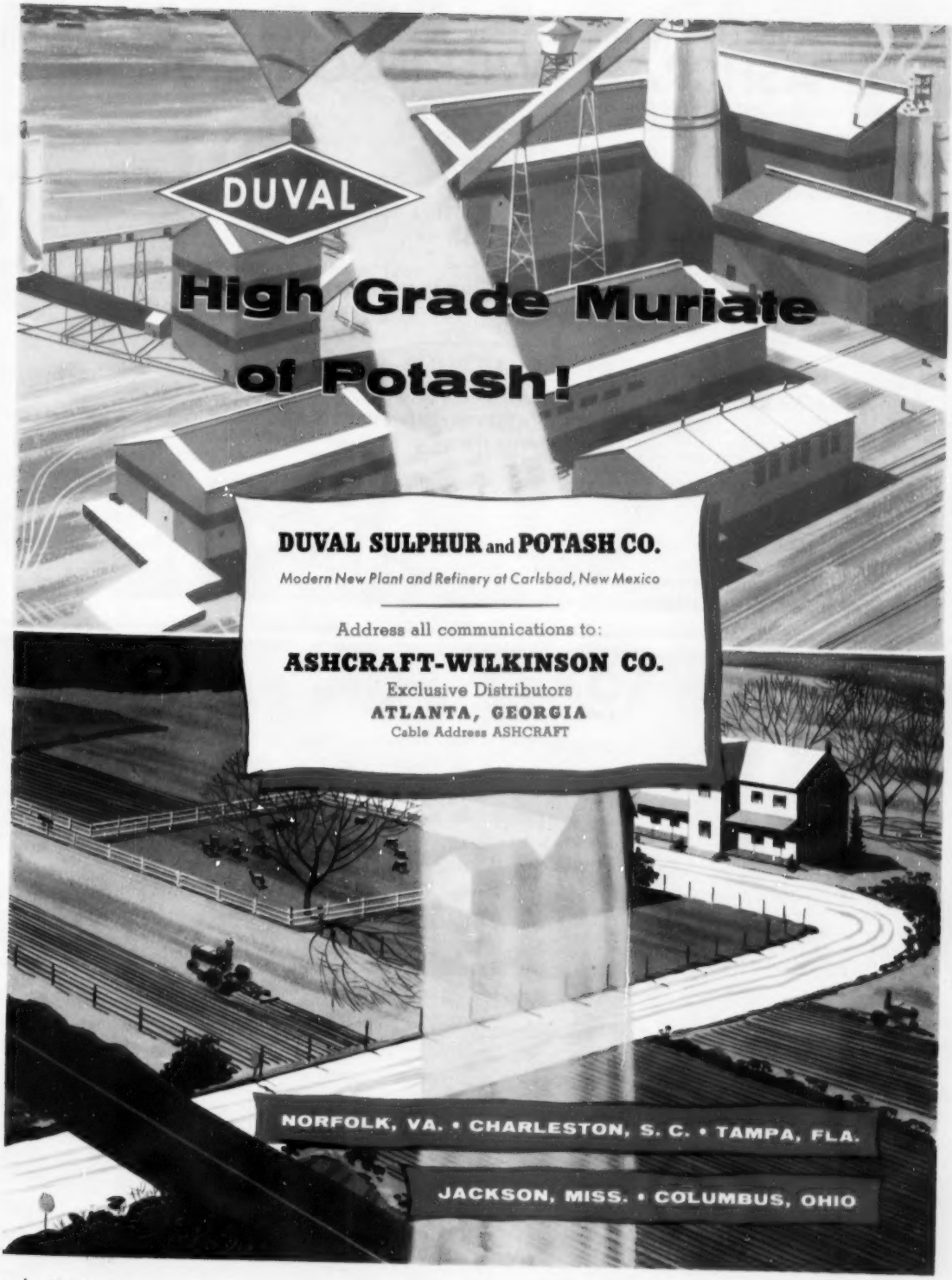
For complete information, write, wire or phone:

GENERAL INDUSTRIAL DEVELOPMENT CORP.

270 Park Ave., New York 17, N. Y.

AGENTS FOR ST. GOBAIN PROCESS.




DUVAL
High Grade Muriate of Potash!
DUVAL SULPHUR and POTASH CO.
Modern New Plant and Refinery at Carlsbad, New Mexico
Address all communications to:
ASHCRAFT-WILKINSON CO.
Exclusive Distributors
ATLANTA, GEORGIA
Cable Address ASHCRAFT
NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA.
JACKSON, MISS. • COLUMBUS, OHIO

ASHCRAFT - WILKINSON CO.

Fertilizer *Oil Seed*

Materials *Meals*

Home Office: ATLANTA, GA.
Cable Address
ASHCRAFT

Offices: NORFOLK, VA., CHARLESTON, S. C.
TAMPA, FLA., JACKSON, MISS., COLUMBUS, OHIO

Exclusive Distributors: DUVAL SULPHUR & POTASH COMPANY
AMMONIATES — FEED STUFFS — SULPHUR
INDUSTRIAL AND AGRICULTURAL
CHEMICALS

to use the process. Patents have been filed internationally.

NORWAY

Det Norske Zinkkompani A/S are planning a phosphoric acid plant at Odda, which is being designed for them by **The Dorr Co.**

PHILIPPINES

Sulphuric Acid imports have been restricted by resolution of the Central Bank's monetary board on the basis of a report by the Manila Institute of Science which says that the Philippine product compares favorably with foreign products and that the present capacity of 10 daily tons is enough to take care of local needs.

POLAND

Waning agricultural output has brought out an order to the Polish chemical industry to jump chemical fertilizer production 35% during the next 24 months. This is a shadow of a similar situation within USSR, where radical changes have also been ordered in fertilizer production.

NITROGEN EXPANSION SURPRISES INDUSTRY

Excess capacity has already resulted from the rush to expand ammonia production under the sudden and quite unexpected decision of ODM to increase the nitrogen goal by 570,000 tons. And a number of plants now under construction are due to come into production this year. The nitrogen producers are naturally disturbed by the situation, though there is optimism elsewhere.

The new president of the Agricultural Ammonia Institute, E. W. Thomas, speaking in Memphis a month back, predicted a shortage of anhydrous ammonia, despite the "Government forecasts of a 20% greater supply." He cited a survey made by the Institute which shows that 40% of the nation's agricultural nitrogen supply this year will be in liquid form.

Others comment that while there is now surplus capacity the strong upsurge in popularity of concentrated ammonia forms for direct application has resulted in demand that in some areas exceeds available supplies.

But the point made by various factors in the industry is that the announcement came as a total surprise, whereas in the past it has been usual to discuss such moves with the affected portions of the industry, to give them time to make their views known, and to prepare for the change. The question is being asked—"Why the shift in policy?"

SPENCER OPENS VICKSBURG AMMONIA PLANT

A representative group of the nation's industrial press visited the Spencer Chemical Company's new chemical works at Vicksburg, Miss., on February 2. This new anhydrous ammonia plant is just undergoing its "shake-down run." It is the first plant to use commercially the partial oxidation process, although other plants of this type are under construction.

In the partial oxidation process, Spencer liquefies about 1,000 tons of air per day. The liquid air is separated by fractionation into nitrogen and oxygen. The oxygen is then utilized to partially oxidize natural gas, whch releases hydrogen. From this point on, conventional methods of purification, compression and synthesis are used to "marry" three parts of hydrogen to one part of nitrogen, creating ammonia.

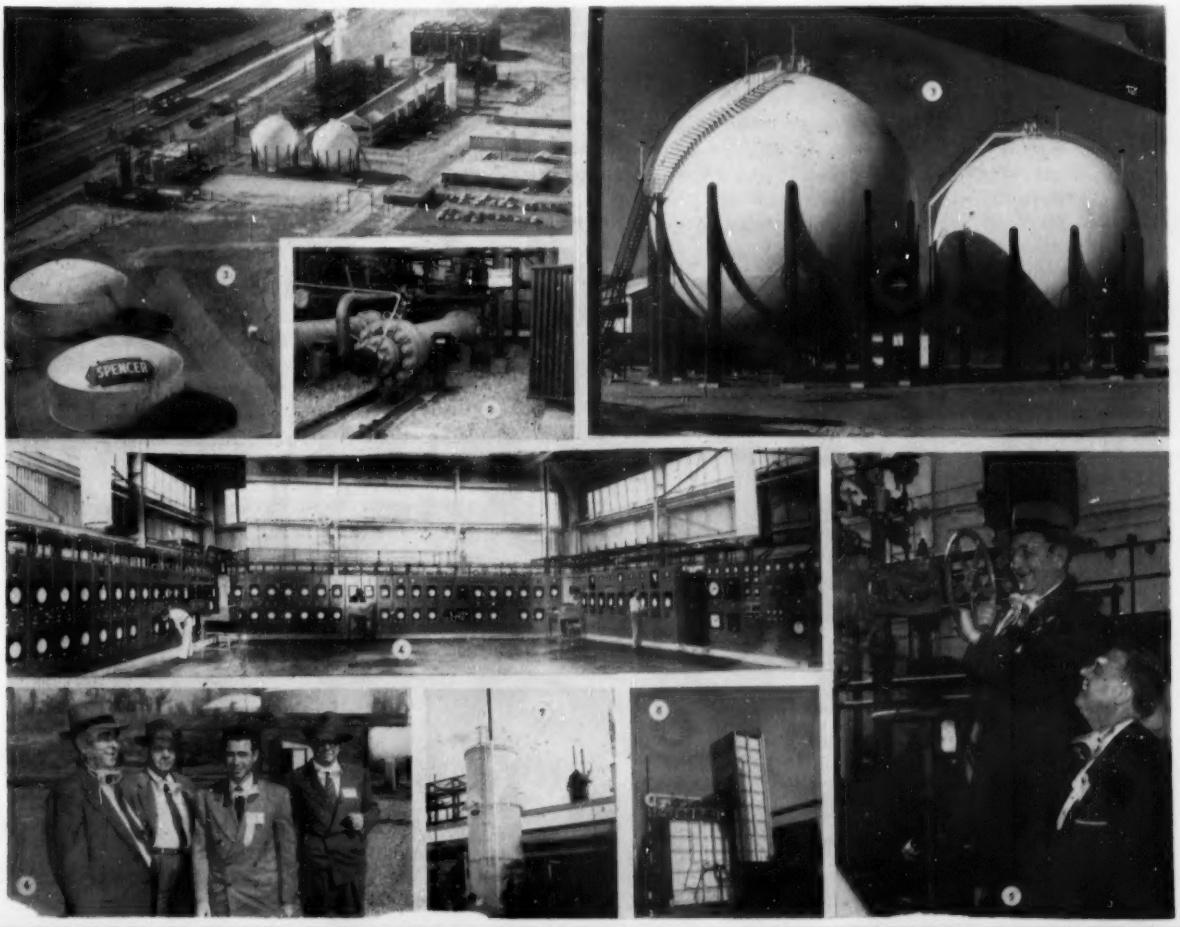
The partial oxidation process is the result of extensive research and development by the Texaco Development and Hydrocarbon Research Corporations, each of which owns basic patents. This new ammonia plant was designed by Spencer Chemical Company. Foster-Wheeler Corporation was retained as engineer and constructor for specialized portions of the work.

Kenneth A. Spencer, president of the company, said: "The outstanding feature of this new works is its high degree of process coordination. Because the plant design is simple and the layout compact, and because extensive use is made of automatic controls, the operating force will be about one-third of the size required for a conventional plant of similar capacity."

From anhydrous ammonia, the basic product, the new works will also produce nitric acid, ammonium nitrate solutions, and Spensol (a high-nitrogen-content solution used as a source of nitrogen in mixed fertilizer).

The original construction estimate for the works was $14,000,000, but Spencer executives say the plant will be completed for something less than this figure, which was calculated in 1951. Initial production started on January 24, meeting the time schedule set over a year ago.

1. View of new Spencer Chemical Company ammonia plant at Vicksburg, Miss. **2.** This new centrifugal circulator, built in Germany, is said to be the first installation of its kind in this country; the manufacturer claims the advantage of holding ammonia's oil content considerably below customary tolerance. **3.** Each of these two "Hortonspheres" has a capacity of 1500 tons; both are used for storage of liquid ammonia. **4.** Three of the plant's eight operating employees are stationed at this huge control panel. **5.** Kenneth A. Spencer, president of the company, opens a valve to start the flow of ammonia as Frank Pyle, manager of the Vicksburg Works, looks on. **6.** Observers at the official dedication ceremonies on February 2 are (left to right) Harry T. Bankston, manager, Magnolia Fertilizer Co., Vicksburg; Kirk Sanders, Spencer representative for Mississippi; John Woodside of Spencer's operations division; and Paul Huey, business manager of the "Progressive Farmer." **7.** Another unusual feature of the operation is this modern "nitrogen wash" tower, thought to be the second installation of its kind in the nation. **8.** This air separation plant is the first step in production of the plant's products.



Left, Dan J. Keating, director of sales for the new Agricultural Chemicals Division of Stauffer Chemical; John H. Kennedy, center, is Eastern salesmanager; Robert A. Lamoree is Western salesmanager of the Division.

William M. Clines, who has been appointed to be Western salesmanager of the heavy chemicals division of American Potash & Chemical Corporation.

Personals

O. C. Minton, whose retirement as vice-president of **Naco** was reported here last month has bought from them their Fort Pierce **Farm Supply Store,** which he opened for Naco and managed until his duties during the construction of the new Naco fertilizer plant made it necessary for him to relinquish its management. **The International Harvester** agency will be operated as **The Minton Equipment Co.,** with former employees of the store, **J. S. Weathers** and **E. J. Minton.**

* * *

J. Albert Woods, president of **Commercial Solvents Corporation,** speaking before the Rotary Club in Terre Haute, Ind. middle of last month stated: "What American business faces in 1954 is no more than an adjustment to a new set of conditions brought on by the cessation of the Korean hostilities, reduced defense expenditures and post war demand and supply becoming balanced in a number of business fields . . . there is good reason to believe (it) will be on a sounder footing when the 1954 business adjustment is completed. . . . With a rapidly expanding population, farsighted research, ample resources and a fine spiritual heritage upon which to build, there is every reason for us to face the future with confidence."

* * *

R. W. Breidenbach has been named assistant general manager of **Commercial Solvents'** agricultural chemical sales department, **Clyde T. Marshall,** general manager, has announced.

* * *

Wendell Glaspey, production manager of the **Blue Valley Fertilizer Co.,** Marysville, Kansas, was named president of the concern when it was incorporated February 1.

* * *

William A. Willis has been made superintendent of **Virginia-Carolina's** new triple superphosphate unit near Nichols, Florida. He has been with them since 1937. Named also to posts at the new unit were **William C. Thomas** and **Joseph W. Venable** as assistant superintendents; **James Edgar Hatch,** assistant superintendent in charge of the sulphuric acid plant; **M. J. Houston, engineer.**

* * *

W. H. Millington, Jr. and **Robert H. Mullett** have been promoted by **Spencer Chemical.** Millington, with them since 1942, to North-Central district sales manager of industrial chemicals. Mullett, who joined up in 1950, to industrial sales representative, will transfer to Chicago, under supervision of Mr. Millington, there.

* * *

Frank J. Ronan has been named Chicago district sales manager for **Grace Chemical.** He was formerly with **Pittsburgh Coke & Chemical.**

* * *

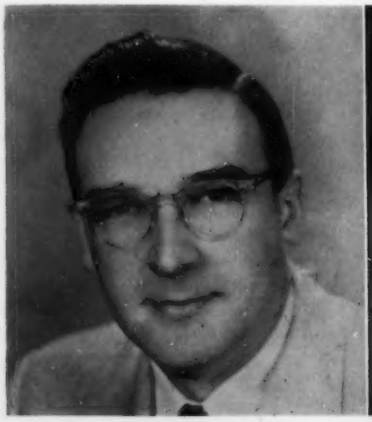
William N. Enstrom, chairman of Irving Trust Company has been made a director of **Arkell and Smiths.**

* * *

William A. Copeland was made a director of **Smith Agricultural Chemical Company,** whose board thereby was increased to ten members. He is a grandson of one of the Company's founders. In addition to Mr. Copeland the following are board members: **John E. Powell, Nelson T. White, Clement S. Schmelzer, Carl E. Veth, Stanton G. Prentiss, F. Herbert Hoffman, Jr., Marshall A. Smith, Lowry Sweney, Frank R. Schwartz, Jr.**

Dr. P. L. Veltman, newly appointed director of research and development, Davison Chemical.

Right, J. E. Fitzsimmons, Union Bag and Paper multiwall sales representative who has been moved from Chicago to Detroit and will cover Michigan and Indiana. Left, D. W. Rauch, moved from Chicago to cover Wisconsin and Illinois.



For Increased TONNAGE and PROFITS...

Start The Ball Rolling With TC MINERALS!

TENNESSEE CORPORATION

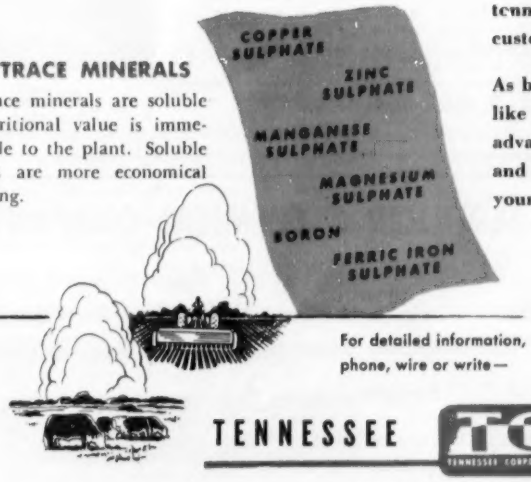
The modern farmer is insisting more and more that his fertilizer be a completely mineralized fertilizer. He is insisting on mineralized fertilizer because the results have been so conclusive—healthier plant growth, greater crop yield, and larger dollar profit per acre.

Mineralized fertilizer will stimulate fertilizer sales for you . . . produce greater tonnage volume . . . more satisfied customers . . . and increased profits.

As basic producers of minerals, we would like to discuss with you the advantages of mineralized fertilizer and how mineralized fertilizer will increase your tonnage and profits.

SOLUBLE TRACE MINERALS

Tennessee's trace minerals are soluble and their nutritional value is immediately available to the plant. Soluble trace minerals are more economical and faster acting.



For detailed information, phone, wire or write—

TENNESSEE TC CORPORATION

617-29 Grant Building, Atlanta, Georgia

Philip Terry, new Eastern district manager for Highway Equipment Company, with headquarters at Carlisle, Pa., covering Pennsylvania, Maryland, Delaware, Virginia, West Virginia, New York, New Jersey, Rhode Island, Connecticut, Vermont, Massachussetts, New Hampshire, Maine, D. C., Quebec, Eastern Ontario and the Maritime Provinces.

Right, F. H. Ludington, Jr., elected vice-president; William N. Brock, vice-president and general salesmanager of Chase Bag. Both have seen long service with the company.

The following officers were re-elected:

John E. Powell, President; **Nelson T. White,** 1st Vice Pres. & General Sales Manager; **Elmer C. Barsch,** Vice Pres. & Div. Manager of the Saginaw, Michigan plant; **Marshall A. Smith,** Vice Pres. & Sales Manager of the Columbus Division; **William F. Farley,** Vice Pres. & Div. Manager of the Indianapolis Division; **Clement S. Schmelzer,** Treasurer; **Carl E. Veth,** Secretary; **Joseph W. Sheeran,** Asst. Treas. & Auditor; **Frank H. Nicklaus,** Asst. Secretary.

Dick Miles, former vice president and division manager of the Holland, Michigan plant retired November 1, 1953. **Harry R. Smith** has been appointed in his place and will serve as division manager of the Holland, Michigan, division.

* * *

New appointments and a revised plan of organization for **Davison Chemical's** research and development division are announced by **Dr. P. W. Bachman,** vice-president in charge of the division.

Dr. P. L. Veltman has been advanced to director of research and development from manager of the Curtis Bay (Baltimore) Laboratories. **Ralph E. Hope,** formerly manager of research engineering, has been made an assistant director, his duties including management of the laboratories. **L. L. Baral** has succeeded him as manager of research engineering. **W. W. O'Loughlin** has also been named an assistant director. He was formerly manager of the development department, in which position he is succeeded by **O. D. Myrick.**

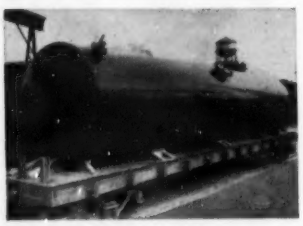
Edwin M. Glocker, formerly staff

ALUMINUM TANK
9'-0" Diameter x 30'-0" Long
12,825 Gallons

"Cole" can furnish tanks made of **steel, aluminum** and **stainless steel** — built in accordance with ASME Code to meet all insurance requirements. Measuring tanks of Stainless Steel are carried in stock.

We invite your inquiries for Storage Tanks to handle Anmonia and Nitrogen Solutions. Anhydrous Ammonia—complete with fittings. Also Elevated Water Tanks, Acid or Oil Storage Tanks, Bins, Boilers, Stacks, etc.

R. D. COLE MFG. COMPANY
Newnan, Ga.



STEEL TANK
8'-6" Diameter x 38'-6" Long
16,500 Gallons

SOUTHERN FERTILIZER & CHEMICAL COMPANY

Main Office: Savannah, Georgia

Superphosphate — Sulphuric Acid — Complete Fertilizers
Ammoniated Superphosphate

Export — Import

Plants: Savannah, Ga., Atlanta, Ga.,
Charleston, S. C., Roebuck, S. C.

Douglas W. Hayward, who has joined the mid-West sales force of Albemarle Paper's multiwall bag division, and will represent them in Iowa and Nebraska. He has been with Jaite and with Fulton Bag & Cotton.

assistant to Dr. Bachman, has been made manager of the research statistics department, a new post. **Luther O. Young** is manager of the application research department, another new post. Dr. Bachman's staff assistants are **C. D. Helm** and **A. J. Antonious.**

* * *

Alfred M. Esberg, a director and a vice-president of **American Potash & Chemical Corporation** has resigned from that company as of February 28.

Pacific Coast Borax Forms New Division

Pacific Coast Borax Co., Division of Borax Consolidated, Limited, has announced the establishment of a new Plant Food Division to be headed by Dr. James A. Naftel. Dr. Naftel will be responsible for the direction of sales and sales development in this Division.

Prior to his new appointment Dr. Naftel was the Southern Agronomist for the Company, and he will continue to direct the new Division from his present office—First National Bank Building, Auburn, Alabama.

Dr. Naftel is a graduate of Alabama Polytechnic Institute where he received his B.S. and M.S. degree, and from Ohio State University where he received a Ph.D degree. Following the completion of his graduate work, Dr. Naftel served for 14 years on the teaching and research staff of the Agronomy and Soils Department at Alabama Polytechnic Institute, except for a period of 4 years when he was an Officer in the Army.

Dr. Naftel's chief fields of research have been in soil fertility investigations involving soil acidity methods of analysis, need and use of lime, effect of soil reaction on the availability of trace elements with special reference to boron and, more recently, to applied research in production of certified seeds and grassland farming. He is the author of more than 25 scientific articles, papers, and bulletins relating to soil fertility and chemical methods of analysis which have been published in this country and abroad.

Dr. Naftel

The Company pointed out that this new Division has been organized because of the wide spread and increased use of their various products, including Fertilizer Borate, Colemanite, and Polybor. These products are used in mixed fertilizers, and for direct application in correcting and preventing boron deficiencies in the soil.

Stop acid fumes from feeding

on your investment!

● Corrosive acid fumes can eat into unprotected metal and destroy it in a matter of months. But you can protect your plant—and your investment—by coating vulnerable metal with the double protection of Bituplastic® Primer and Bituplastic® No. 28.

This protective coating is specially formulated from a coal-tar pitch base. It builds up a thick, tough barrier between metal and fumes from industrial operations. It provides protection against weather, too.

Bituplastic No. 28 doesn't check or crack. It doesn't support combustion. And it has proved its worth in fertilizer plants by protecting galvanized roofing and siding for long periods of time. Write for full information, or see our catalog in Sweet's Plant Engineering File.

Sold through Industrial Distributors

KOPPERS BITUMASTIC® PROTECTIVE COATINGS

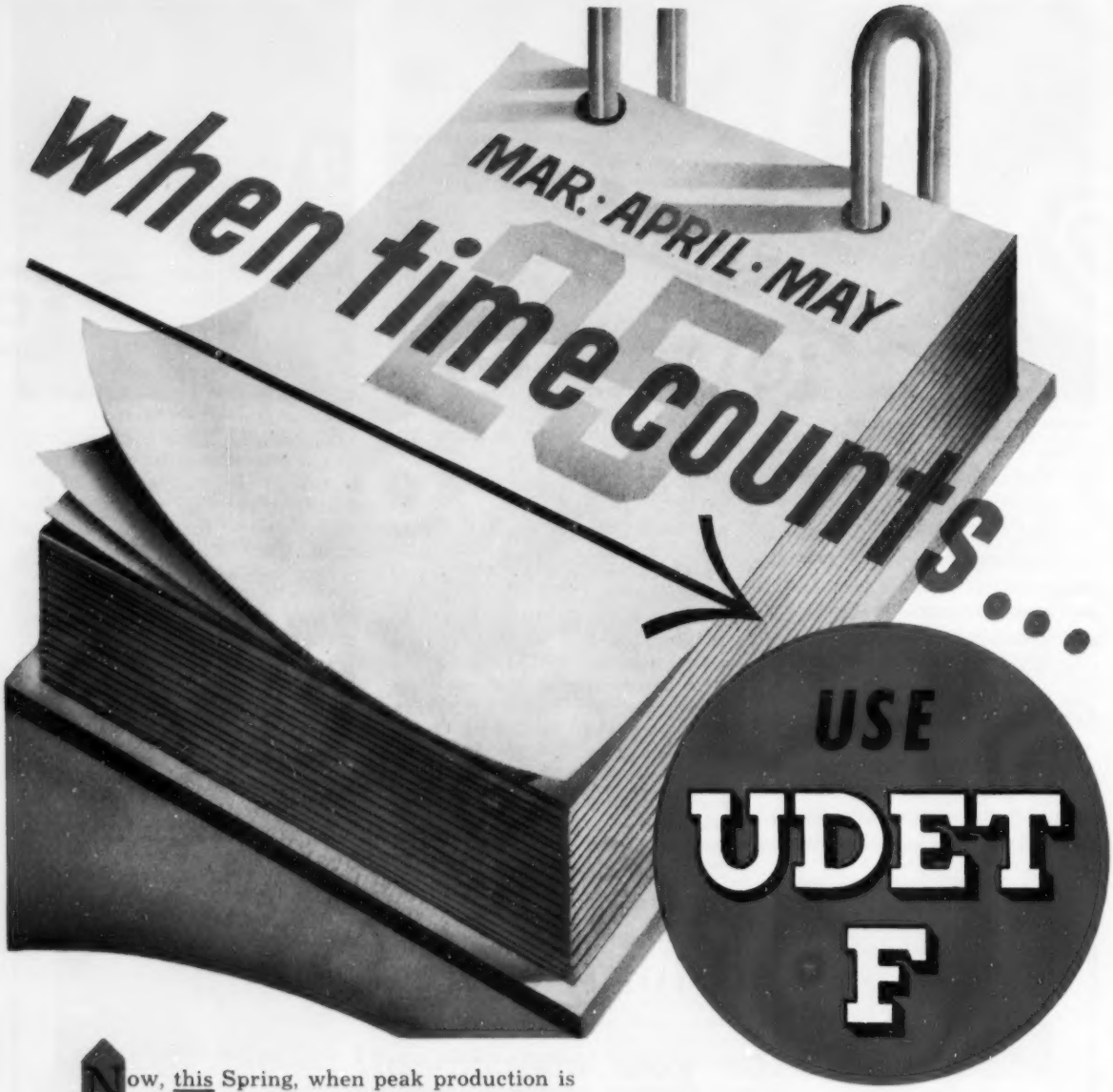
® *Reg. U. S. Pat. Off.

KOPPERS COMPANY, INC.

Tar Products Division

Dept. 373-T, Pittsburgh 19, Pennsylvania

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.



Now, this Spring, when peak production is your goal, use UDET F and get: Faster curing. Easier handling of materials. Faster milling and screening. Minimum "down" time.

Maintain maximum production. And deliver a fully-cured product, practically free from caking, for continued customer satisfaction.

Use UDET F, the *one* surfactant *proved* by fertilizer makers in conclusive tests!

UDET 95F — a 95% active granular powder
UDET 50F — a 50% active free-flowing liquid

IN ACIDULATION, UDET F is up to 3-times more effective than competing products in the presence of calcium ions.

IN AMMONIATION, UDET F, being instantly soluble, disperses completely in the mix. Permits higher absorption of ammonia.

IN GRANULATION, UDET F inhibits cake build-up and equipment fouling. Increases production through less "down" time.

IN AMMONIUM SULFATE PRODUCTION, UDET F lowers moisture content. Provides anti-caking properties.

STOCKS AVAILABLE AT LOCAL WAREHOUSES

Eastern Distributors:
PHILLIP BROS. CHEMICALS, INC.
37 Wall Street,
New York 17, New York

Midwestern Distributors
THOMPSON-HAYWARD
CHEMICAL CO.
18 Branch Offices
Headquarters: Kansas City, Mo.

UDET

UNIVERSAL DETERGENTS, INC.
1825 East Spring Street, Long Beach 6, California

Division, PETROCHEMICALS CO.
Danciger Building, Ft. Worth, Texas
Eastern Sales Office: Graybar Bldg.
420 Lexington Ave., New York 17, N.Y.

Safety

GORNTO OUTLINES HISTORY OF SAFETY SECTION

Address of Vernon S. Gornto, general chairman fertilizer section, National Safety Council at the Southern Safety Conference, March 8, 1954 Louisville, Kentucky.

Mike Ellison asked me to speak on the Progress of the Fertilizer Section of the National Safety Council. As General Chairman of the Fertilizer Section, there is no subject I had rather talk on. However, the accomplishments of the Fertilizer Section to date have not been sufficiently multitudinous to require thirty minutes to tell you about them. Therefore, I think I would like to divide my talk into three parts.

1) Tell how Fertilizer Section came into existence and what the accomplishments to date have been.

2) Discuss with you our immediate and future objectives.

3) Try to show you how you men here today can assist the officers in the Fertilizer Section in achieving our objectives.

It was at the Chemical Meeting of the National Safety Congress in Chicago in October, 1950 that three of the delegates got together and discussed safety in the fertilizer industry. They deplored the high frequency rate in the industry and mentioned what a shame it was that the National Safety Council had no program and no specific service to render the fertilizer industry.

The three men engaged in this conversation back in October, 1950, were A. B. Pettit of the Davison Chemical Company, John E. Smith of Spencer Chemical Company and Jack Fields of Phillips Chemical Company. As a result of the conversation these three men had on that October day, three and a half years ago, they agreed to take immediate steps to see if a Fertilizer Section could not be organized within the National Safety Council. Three meetings were held that year. The first in Pittsburg, Kansas; the second in Bartlesville, Oklahoma, and the third in Baltimore, Maryland. Letters were sent out by the three men inviting representatives of other fertilizer companies interested in Safety to meet with them. A. B. Pettit was elected as the first General Chairman. Jack Fields was elected Vice Chairman and John Smith as Secretary.

In October, 1951, this group held its first meeting as a part of the National Safety Congress. This first meeting was held as a division of the Chemical Section. At the 1951 meeting Jack Fields was elected General Chairman; John Smith, Vice Chairman and I was elected Secretary.

Much work was done during the next year. A splendid program was arranged by Program Chairman John Smith, for the Congress Meeting in October, 1952. At a meeting of the Executive Committee in December, 1951, committee chairmen were named by General Chairman, Jack Fields. Most of these committee chairmen have served continuously and served well since their appointment. We have the following standing committees:

Public Relations — Larry Shopen of Consumers Cooperation In Kansas City, Missouri.

G.L.F. Soil Building Service in News Letters — Tom Clarke of Ithaca, New York, as Chairman.

Membership Committee — Roger Hugg of I.M.C., Chicago, Illinois, as Chairman.

Visual Aid—Ed Burroughs of F. S. Royster Guano Company, Norfolk, Virginia, as Chairman.

Speakers Bureau—Harold Krueger of Snyder Chemical Company, Topeka, Kansas, as Chairman.

Engineering Committee — A. B. Pettit of The Davison Chemical Corporation, Baltimore, Maryland, as Chairman.

Statistics & Safety Contest — Wayne High of Baugh Chemical Company, Baltimore, Maryland, as Chairman.

Engineering & Data Sheet—John Rozzel of the Mathieson Chemical Corporation, Baltimore, Maryland and Parker Kemp of Liberty Mutual Companies.

Legislative Committee — Ralph Fraser of Summers Fertilizer Company, Baltimore, Maryland, as Chairman.

The immediate past General Chairman automatically serves as Chairman of the Nominating Committee. Of course, that makes John Smith, Chairman of the Committee this year. We have other special committees appointed by the General Chairman from time to time.

Following our first meeting in Chicago in October, 1950, the two national fertilizer associations, the N F A and the A P F C, purchased blanket memberships for all their members in the N S C. Dr. Russell Coleman and Ed Kapusta of N F A; Paul Truitt and Louis Wilson of

The Danville, Virginia, plant of Smith-Douglass was presented a certificate of merit recently for its outstanding safety record for 1953. In the group at right are Vernon S Gornto, company safety director, who made the presentation; Percy J. Searce, plant manager; J. H. Rimmer, plant superintendent and safety inspector; W. H. Hicks, Glens Falls insurance company and Kenneth Samuels, safety representative of the Virginia Department of Labor and Industry. The meeting was taped by two local radio stations, and was a friendly, informal gathering of employees. The last lost-time accident at Danville took place January 5, 1950, during which period they have worked 400,000 man hours, an all-time record.

For your lead requirements!

CHEMICAL, ANTIMONIAL AND TELLURIUM

sheet lead and lead pipe

Evans Metal Company

Box 97 Northside Station • ATLANTA, GEORGIA • Elgin 4338

A P F C, have given the Safety Movement in the fertilizer industry wonderful support and encouragement. Without their enthusiastic support and cooperation we could not have progressed as successfully and rapidly as we have.

We sent A. B. Pettit to the meeting of the Industrial Conference, which was held in New York City in January, 1953. A. B. was successful in selling the Conference on the idea that we were sufficiently interested to be able to stand alone. The meeting of the Industrial Conference granted independent status to the Fertilizer Section at this meeting in New York City in January of last year. I have been told by some of the top executives with the N S C that no other section of the N S C has made such rapid strides or has ever received independent sectional status as quickly as did the Fertilizer Section.

At the Congress last October, I was elected General Chairman and Curtis Cox, of the Virginia-Carolina Chemical Corporation, was elected as Secretary.

We have 39 members on the Executive Committee of the Fertilizer Section. Thirteen members of the committee are elected, each year for a three year term. We also have four honorary members.

With your permission, I would like to read the names of the present members of the Executive Committee.

TERM EXPIRING 1954

O. O. Banton, F. S. Royster Guano Company, Macon, Ga.; R. E. Bennett, Farm Fertilizers, Inc., South Omaha, Neb.; Charles W. Best, Robertson Chemical Company, Norfolk, Va.; T. J. Clarke, G.L.F. Exchange, Ithaca, N. Y.; R. G. Diserens, Phillips Chemical Company, Bartlesville, Okla.; U. C. Ellis, Swift & Company-Plant Food Div., Chicago, Ill.; Ralph Fraser, Summers Fertilizer Company, Baltimore, Md.; V. S. Gornto, Smith-Douglass Company, Inc., Norfolk, Va.; H. R. Krueger, The Snyder Chemical Company, Topeka, Kansas; A. B. Pettit, The Davison Chemical Corporation, Baltimore, Md.; J. L. Shopen, Consumers Coop., Association, Kansas City, Mo.; J. M. Sisson, Tennessee Valley Authority, Wilson Dam, Ala.; J. E. Smith, Spencer Chemical Company, Pittsburg, Kansas.

TERM EXPIRING 1955

Carl Beth, Smith Agricultural Company, Columbus, Ohio; E. J. Buhner, Buhner Fertilizer Company, Seymour, Indiana; Adolph F. Ecklund, Farm Bureau Service, Saginaw, Mich.; George C. Hollinger, Southwest Potash Company, Carlsbad, New Mexico; James E. Leeper, Gates Brothers, Wendell, Idaho; T. Walter Houser, Southern California Fertilizer Co., Los Angeles, Calif.; Dewey Lange, Lange Brothers, St. Louis, Mo.; H. V. Lehn, I. P. Thomas & Son Company, Paulsboro, N. J.; John S. Mark, Iowa Plant Food Company, Des Moines, Iowa; James M. Quinn, California Sun Fertilizer Co., Los Angeles, Calif.; W. A. Stone, Wilson & Toomer, Jacksonville, Fla.; C. J. Watts, Jr., Naco Fertilizer Company, Wilmington, N. C.; Roy White, Lion Oil Company, El Dorado, Ark.; Lloyd W. Woodiwiss, Thurston Chemical Company, Joplin, Missouri; M. S. Wright, Jr., Texas Farm Products Company, Nacogdoches, Tex.

DOLOMITIC **LIMESTONE**

ANALYSIS GUARANTEED

. . . 60% Calcium Carbonate
. . . 39% Magnesium Carbonate

WILLINGHAM-LITTLE STONE COMPANY

1201-4 Healey Building, Atlanta 3, Ga.

"40 Years Service to the Fertilizer Industry in the Southeast"

Superphosphate Producers . . .

Improve Your Product 3 Ways With

STEROX AJ

Add soluble, stable Sterox* AJ wetting agent to your acid and get this three-way processing help:

1. A better-conditioned product . . .
crumbly, homogeneous, easy-to-handle and free from lumps.

2. More efficient conversion . . .
improved wetting brings reactants into more intimate contact, aids in making reaction more effective.

3. Lower processing costs . . .
use of 60° Baume acid eliminates dilution step. Less labor is required for maintenance, since mixer and den are cleaner. Ammoniation is easier.

For more information write MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

*Reg. U. S. Pat. Off.

For Improved Mixed Goods Use . . .
SANTOMERSE* No. 1

Increases reaction rate
Reduces lumping and caking
Cuts curing time

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY . . .
WHICH SERVES MANKIND

TERM EXPIRING 1956

Allan Brent, Southern Fertilizer & Chemicals Co., Savannah, Ga.; Willis A. Buie, Canada Packers, Ltd., Toronto, Canada; E. O. Burroughs, Jr., F. S. Royster Guano Company, Norfolk, Va.; E. N. Carvel, Vallaint Fertilizer Company, Laurel, Del.; Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond, Va.; Mike C. Ellison, Mississippi Chemical Company, Yazoo City, Miss.; F. Wayne High, The Baugh Chemical Company, Baltimore, Md.; R. L. Hugg, International Minerals & Chem. Co., Chicago, Ill.; Walter H. Lehle, Mathieson Chemical Corp., Baltimore, Md.; Grayson B. Morris, Southern States Cooperative, Richmond, Va.; Gordon W. Pittock, William Stone Sons, Ltd., Ingersoll, Ontario, Canada; William E. Powell, Liberty Mutual Insurance Co., Chicago, Ill.; M. F. Wharton, Arizona Fertilizers, Inc., Phoenix, Ariz.

HONORARY MEMBERS

Sidney H. Bierly, California Fertilizer Assoc., San Marino, Calif.; Dr. Russell Coleman, National Fertilizer Assoc., Inc., Washington, D. C.; P. T. Truitt, American Plant Food Council, Inc., Washington, D. C.; Henning Waltersdorph, Pacific Northwest Plant Food Assoc., Seattle, Wash.

Now, to mention some of the accomplishments of the Fertilizer Section.

1) Increased interest in Safety for the fertilizer industry.

2) Secured wide and favorable publicity through all the trade magazines due to the splendid work of Larry Shopen, Chairman of the Public Relations Committee.

3) Published regularly, each month, the best Sectional News Letter ever published by any Section of the N S C—thanks to our hard-working Editor, Tom Clarke.

4) The Visual Aid Committee, under the leadership of Ed Burroughs as Chairman, has designed, prepared and made available for sale, by the National Safety Council, twelve posters dealing with particular accident hazards in the fertilizer industry.

5) The Visual Aid Committee has also prepared a Safetygraph dealing with the proper operation of Hand Trucks. We have just received these Safetygraphs from the printer, and they are now available for distribution.

6) Our Program Committees have, for the last three years, furnished very outstanding programs.

7) The Engineering Committee has published several Data Sheets.

8) Last year we promoted and conducted the first Safety Contest for the Fertilizer Section. We feel that it was quite successful. There were 133 contestants. We are conducting another contest this year.

9) Prevailed upon safety divisions of the State of North Carolina Labor Department to initiate a special concentrated two year Safety Program in the fertilizer industry in the State of North Carolina.

10) Plans are now underway to get such drives started in Georgia, Virginia and several other states.

This is the Baker-Lull Model 20 Shoveloader at work, demonstrating its compactness, 90" turning radius, which makes it highly maneuverable in tight spots, such as the unloading of box cars. The 12 cubic foot bucket is as wide as the machine, making orderly stockpile work easy by clearing a path for the wheels as it goes. For complete details write Baker-Lull Corp., 314 West 90th Street, Minneapolis 20, Minn.

11) We have furnished speakers for meetings of various fertilizer groups throughout the Nation. Harold Krueger, N F A, two years ago—John Smith, N W P F A, British Columbia, Last November. Virginia State Safety Conference—North Carolina State Safety Conference—Maryland State Safety Conference. Southern States Safety Conference.

12) Since the organization of the Fertilizer Section, the number of fertilizer companies holding independent "company membership" with N S C, has increased over 500%. We have a drive on now to increase the membership in the Fertilizer Section of the N S C—and this leads me into the second part of my talk.

The immediate and future objectives of the Fertilizer Section—At our meeting in Chicago at the time of the National Safety Congress last October, we set for ourselves 16 goals for the year. I would like to read you these 16 goals.

1) Increase membership.

2) Promote interest in Safety in every one of the 1,057 fertilizer manufacturing plants in the United States and Canada.

3) See that copies of the fertilizer posters are sold and used by all the fertilizer companies throughout the Nation.

4) Provide new and additional posters.

5) Promote the distribution and use of the Data Sheets which we have prepared during the last year specifically for the fertilizer industry.

6) Prepare additional Data Sheets.

7) Maintain and further develop interest in local safety movements in the fertilizer industry.

8) a) Southern Safety Conference —Louisville, March 8, 1954.
b) North Carolina State Safety Conference — Raleigh, North Carolina, May 4th, 5th and 6th.
c) Virginia State Safety Conference — Norfolk, Virginia, May 20-23, 1954.
d) Maryland State Safety Conference—Baltimore, Maryland, May 6-8, 1954.

8) Try to have the safetygraphs we now have widely distributed throughout the industry.

9) Develop additional Safety-

graphs, applying specifically to the fertilizer industry.

10) Build a bigger and better Safety Contest.

11) Continue the excellent publicity and public relations program which Larry Shopen has carried out so splendidly during the last two years.

12) Continue to maintain the high standard of excellence of the Fertilizer News Letter.

13) Work for the next twelve months towards staging outstanding 1954 Congress Meeting of the Fertilizer Section.

14) Developing new ways and methods of selling to management the importance of sending representtatives to this annual meeting of the Fertilizer Section of the National Safety Congress.

15) Having representatives from our group as speakers on all the state fertilizer meeting programs whenever possible.

16) Arousing and maintaining a higher degree of ENTHUSIASM in the army of our members, among all plant and safety directors, production managers, and, especially among representatives of top management.

Now, we come to the third part of my talk—"What can you men here today do to help the officers of the Fertilizer Section achieve our 1954 GOALS?" You can do much to help us achieve each one of the 16 Goals. We solicit your help—**we need it.**

First of all, we need all of the help we can get in increasing the membership—the very first thing—is there anyone present at this meeting today whose own company does not belong to N S C? Please see that this is eliminated as soon as you reach home. Just by chance I happen to have a few applications with me today. Anyone interested can see me after the meeting.

Next, I would like to implore each of you men sitting in this room today to contact all the fertilizer manufacturing plants in your state and sign them up in the N S C. You can do this much easier than can any of your National Officers.

Now, on objective Number 3, or Goal number 3 in the list of Goals for 1954. If your company has not already bought the copies of the Fertilizer Section Posters for each of your plants, please do this immediately upon your return home. Order them from the N S C—they cost only $2.00 for a set of twelve.

Now, on Goal number 10—"Build a Bigger and Better Safety Contest." You can all render material aid to help us achieve this objective. You can contact all the fertilizer manufacturing plants in your state, and urge them to enter their plants in this year's Safety Contest. Certainly, each of you will want to see to it that each of your company's plants is entered in the Contest.

Now, on objective number 12—send Tom Clarke news articles about yourself and reports of accidents occurred in your plants—write articles on any phase of safety.

Now, number 16—the last of our 16 Goals. "Arousing and maintaining a higher degree of enthusiasm in the army of our members, among all

BERKSHIRE

Specialists in

Magnesia for Agriculture

EMJEO (80/82% Magnesium Sulphate)
Calcined Brucite (fertilizer grade) 70% MgO
Calcined Magnesite 85 to 95% MgO

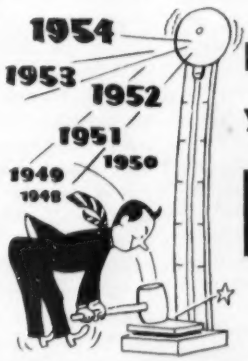
POTNIT
(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

INSECTICIDES — FUNGICIDES
Mercury Compounds
for Agricultural Use

DITHIOCARBAMATES
Ferric — Zinc

EXPORT - IMPORT

BERKSHIRE CHEMICALS, INC.
420 Lexington Avenue, New York 17, N. Y.
Cable Address — "Berkskem" New York
55 New Montgomery St., San Francisco 5, California



PROVED GOOD
year after year!

FUR-AG®
the sterilized organic conditioner

For Years . . . First Choice of Leading Fertilizer Manufacturers

Fur-Ag has been *proved in use* by leading fertilizer manufacturers. Fur-Ag reduces bag set, promotes drillability, speeds up curing in the pile and provides bulk. It's sterilized—free from plant diseases, insects, weed seeds—and is dark in color. Fur-Ag is an inexpensive organic conditioner—produced in volume the year around, *readily available* on schedule, in bag or bulk. Write for complete information—Bulletin 127.

The Quaker Oats Company
CHEMICALS DEPARTMENT
345 The Merchandise Mart, Chicago 54, Illinois

plant safety directors, production managers, and especially among representatives of top management." Talk up Safety everywhere you go. Put lots of enthusiasm in your work. It has been said that "Faith can remove mountains." Let us remember, however, that enthusiasm is "Faith in Action." It is up to those of us who are charged with the responsibility of promoting safety in our industry to put everything we have into our work. I dropped in a little restaurant here on Lexington Avenue yesterday for a bowl of soup. They had two soups listed on the menu; Vegetable Soup and Enthusiasm Soup. I asked the waitress what kind of soup was "Enthusiasm Soup." She replied that that was soup made when the Chef swept up the kitchen and put everything he had into the soup. If you put enough enthusiasm in your work you will be successful in selling safety to your Management, your Supervisory Officials and to the employees in your plants. If you talk up safety strong enough and with enough enthusiasm in your contacts with representatives of other fertilizer manufacturing companies, you will be giving the officers of the Fertilizer Section of the National Safety Council a wonderful boost. If you talk up Safety strong enough it simply cannot be pushed aside or neglected.

Safety Council Offers Aid to Program

"Showmanship in Safety" — the National Safety Council's new book is loaded with schemes that help sell safety to workers in new and appealing ways, and can provide a lift for any accident prevention program. It contains more than 150 ideas for displays, demonstrations, stunts, awards and other interest-arousing devices. The book sells for $1.25 to Council members and double that price to nonmembers.

The Council's new series of human relation training films for foremen is now available. Featuring O'Grady, the safety skeptic from the Council's film, "A Gray Day for O'Grady," this three-film set tells how a foreman learns about people.

"Fragile—Handle Feelings with Care" shows how a foreman learns to value and respect the feelings of his workers. "Call 'Em on the Carpet" shows the various methods foremen can employ to correct worker's faults without incurring ill will. "It's an Order" is a humorous film illustrating how supervisors should give orders so that they are understandable and can be carried out efficiently by the worker.

Prepared under the supervision of the Council's industrial department, the films run 12 minutes each and are available in 16mm sound movies as well as 35mm sound slidefilms.

For further information and prices on these films and the "Showmanship" book, write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Davison Cincinnati Plant Host For Safety Meetings

The Davison Chemical Corporation's Cincinnati plant was host at the company's annual safety meeting, held in the Vernon Manor Hotel February 15-17 inclusive. Safety Engineers, industrial relations men, and in some instances superintendents and their assistants from 12 plants attended to learn about new safety methods and to exchange experiences.

A. B. Pettit, Davison's supervisor of industrial health and safety, presided, and J. W. Long, manager of the Cincinnati plant, greeted the visitors. A guest speaker was Dr. James P. Hughes, Professor of Industrial Medicine, University of Cincinnati College of Medicine, who discussed "Industrial Health Program for Small Plants." Among other speakers were representatives of Davison's research, engineering and industrial relations divisions.

Emphasis on safety by Davison has won many awards for the Company —35 in one year from four national organizations.

EXTRACT OF RULES FOR THE FERTILIZER SECTION

Rule 1. Any member of the National Safety Council may enter any of its plants or units which are classified as participating members of the Fertilizer Section.

Rule 2. (a) A unit may be an entire company; a plant, such as a dry mixer, wet mixer, or a complete plant manufacturing its own sulphuric acid; a division, such as two or more plants in the same district or state; a subsidiary of a member company; or a self-contained division or unit of a member company or plant.

(A self-contained unit manufactures one or more products under separate general supervision and does not interchange productive materials with other units).

(b) Each member may enter as many units as he wishes in the fertilizer contest, provided that the units entered are not participants in any other industrial safety contest sponsored by the National Safety Council.

(c) The figures representing the exposure of a particular unit may be entered in the contest only once. For instance: if a company enters one of its plants or divisions in the contest and also enters itself, the exposure of the separately entered plant or division may not be included as part of the company's exposure.

(d) Each dry mix unit must have an average monthly exposure of at least 1,500 man-hours; wet mixing units must have a minimum exposure of 6,000 man-hours; a complete plant must have an exposure of at least 6,000 man-hours.

Rule 3. (a) Contestants shall compete in one of the following four divisions:

DIVISION I. shall consist of dry mixing units having an exposure of at least 18,000 man-hours per year.

DIVISION II. shall include wet mixing units with an exposure of at least 72,000 man-hours per year.

DIVISION III. shall include complete fertilizer plant with an exposure of at least 72,000 man-hours per year.

DIVISION IV. shall include as a unit the complete company operations such as phosphate rock mining, fertilizer manufacturing, shipping, and the manufacture of chemicals and kindred products.

PESTICIDES

NAC SPRING PROGRAM ANNOUNCED BY HITCHNER

National Agricultural Chemicals Association has released the program for its spring meeting, to be held at the Shamrock Hotel in Houston, Texas on March 24, 25 and 26. Lea S. Hitchner, executive secretary of the group, announced that the meeting will highlight problems of pesticide production, marketing and use.

Association President Paul Mayfield, general manager of the Naval Stores Department of Hercules Powder Company at Wilmington, Del., will lead off the program with his presidential address at 10:00 a.m. on Wednesday, March 24. Presiding officers will be Mayfield and NAC Vice-President W. W. Allen of Dow Chemical Company at Midland, Mich.

Addressing the meeting on the initial day will be John C. White, Commissioner of Agriculture for the State of Texas, Austin, Tex. Research and development of chemicals for agriculture in the Southwest will be the topic of a talk by Dr. R. D. Lewis, director of the Texas Agricultural Experiment Station; he will emphasize the importance of insecticides, fungicides and other agricultural chemicals in the progress of agriculture in Texas.

J. A. Walker, credit manager of the Standard Oil Company of California, San Francisco, will discuss the credit situation and its relation to the agricultural chemicals industry. Dr. Stanley B. Freeborn, provost of the California College of Agriculture's Davis Station, will address the convention on the value of pesticides and their contribution to raised standards of living, public health improvement, and the importance of chemicals to agriculture in the United States. This will end the first day's business session.

A reception for members and guests of the group on Wednesday evening will complete the day's activities. Thursday and Friday business sessions will be restricted to members and invited guests only, the program states. Executive Secretary Hitchner announced that there will be a golf tournament on Thursday afternoon, and that plans for Thursday evening include either a banquet or a barbecue for Association members and guests.

Monsanto have added two products to their garden line: **D-Leet** a new herbicide, based on MCP, which will not damage clover, but will control broad-leaf weeds. **Bogey,** an all-purpose insecticide, useful either as a spray or dusted.

* * *

B. F. Goodrich Chemical has a new household insecticide called **Good-Rite Strobane,** which has been accepted for household sprays and aerosols by USDA. It kills many insects immune to DDT.

* * *

Naugatuck division of US Rubber has developed a liquid form of maleic hydrazine, MH-30, which is said to stop the growth of tobacco suckers. One spraying a season is said to replace the usual laborious three-times-a-season hand-suckering, and an insecticide may be used at the same time, if desired, mixed with the MH-30.

COLORADO ASSOCIATION MAKES 100 CONTROL RECOMMENDATIONS

More than 100 changes in the recommendations for control of insects in Colorado have been adopted as a result of the third annual joint meeting of the Colorado Agricultural Chemicals Association and the Colorado Agricultural Chemicals Clearing Committee held in Denver on January 29. Most of the changes result from the proven effectiveness and commercial availability of several new chemicals.

The Colorado procedure for handling changes of insect control recommendations is unique in that it assures full collaboration and agreement between all research and regulatory officials and the manufacturers and distributors of the chemicals. Research data from state and federal experimental workers and from the industry members are analyzed by sub-committees which prepare the proposed recommendation changes, and then all parties have opportunity to criticize and negotiate desirable amendments at the annual joint meetings.

Paul W. Swisher, Colorado Commissioner of Agriculture, is the permanent chairman of the Clearing Committee and presided over the joint meeting. Reports were given on herbicides by Bruce J. Thornton, head of weed control for the Extension Service; on rodenticides by Roy Fugate of the U. S. Fish and Wildlife Service; on insecticides by Gordon T. Mickle, Extension Entomologist: on bean bettle experiments by John L. Hoerner, College Entomologists; on proposed research for 1954 by L. B. Daniels of Colorado A & M; and on regulatory phases by F. Herbert Gates, State Entomologist.

At its separate meeting on the same date, the Colorado Agricultural Chemicals Association elected Ralph W. Farr of Greeley and Orval J. Schall of Monte Vista as new directors, and named Walter D. Smith of the Denver Fire Clay Company as president, Mr. Farr as vice-president with Claine E. Titensor of Agricultural Processing Industries as secretary-treasurer for 1954. Mr. Titensor had previously served as president. The retiring directors were W. E. McCauley of Shell Chem-

ical and Dr. B. Thomas Snipes of U. S. Industrial Chemicals. The 1954 Association Committee chairmen are Fred Cherry of Rohm and Haas Company, fungicides; E. C. Stone of Denver, herbicides; Harold Mankoff of Manco Chemical Company, rodenticides; Howard Beaudoin of the Velsicol Corporation, insecticides; Floyd Knauss of Thompson-Hayward, membership; Robert Reider of Shell Chemical, legal; and J. Newton Hall of Pioneer Chemical Associates, publicity.

* * *

Welcoming more than 200 agricultural leaders, entomologists and representatives of the pesticides industry to the third annual **Pesticide Chemicals School** at Clemson College, S. C. February 9-10, **Dr. O. B. Garrison** of the South Carolina AES said that as much as $8,000,000 a year is spent in South Carolina for control of farm pests.

* * *

USDA research reports indicate that **Endrin** is the best insecticide thus far tested against the combination of bollworm and boll weevil. It also controls several other cotton pests, but not pink bollworm nor spider mites, and has a longer-lasting residual action than toxaphene, the only other insecticide recommended for control of both the boll weevil and bollworm.

* * *

Dow Chemical has developed a wholly new herbicide named **Silvex,** whose chemical name is trichlorophenoxypropionic acid. It reportedly shows a greater margin of safety near cotton as a weed and brush killer than 2,4-D. None will be sold in 1954 for farm use.

* * *

PAM, the Inter-Association Council of Pesticide and Applicator Manufacturers, has launched a nationwide program to help dealers build up sales and profits by showing the public how to use the right pesticide with the right applicator at the right time.

Andrew Technical Service Bulletin

Bulletin #700, a 16 page document with comprehensive data and illustrations, has been published by Andrew Technical Service, Chicago 26, Illinois, and will be sent free on request.

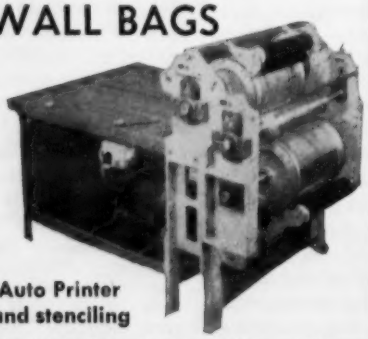
Union Bulletin on Small Paper Bags

A new illustrated bulletin entitled "Here's How to Close Small Paper Bags" has been issued recently by Union Special Machine Company, Chicago manufacturer of industrial sewing machines.

Emphasizing the importance of speed and economy in closing small paper bags, the new brochure—Bulletin 100—describes and illustrates the various Union Special equipment designed for these operations. The features of Style 60000 D sewing head, as well as the advantages of the Dubl-Tape closure, are explained in detail.

Interested readers may obtain copies of the bulletin by addressing requests to Union Special Machine Company, 400 North Franklin Street, Chicago 10, Illinois.

PRINT YOUR OWN MULTIWALL BAGS AS YOU NEED THEM



Industrial's Auto Printer Eliminates hand stenciling

Is suitable for imprinting information, addresses, marking, or whatever you may require on your containers or multi-wall bags. It is capable of printing as many as 2400 units per hour.

This is just one of Industrial's coding and marking machines designed specifically for your needs to assure more efficient marking and movement of materials on production lines. Marking equipment is also available for conveyor line use.

Let us help you—send us your marking problem; we will do the rest.

Write for catalog today.

INDUSTRIAL MARKING EQUIPMENT CO.

Designers and Builders of Marking Equipment for Industry

Dept. C.F., 454 Baltic Street

BROOKLYN 17, N.Y. MAin 4-2601

Cut Production Costs—

Speed up your plant with

ATLANTA UTILITY FERTILIZER MACHINERY

Fertilizer Mixing Systems	Elevators
Revolving Screens	Fertilizer Shakers
Mixing Plows	Cage Mills
Clod Breakers	Batch Mixers

Write Today for Descriptive Folder

ATLANTA UTILITY WORKS

EAST POINT, GA.

EMPIRE

"That Good"

SULPHATE of AMMONIA

Inquiries Invited

DEBARDELEBEN COAL CORP.

2201 First Ave., N. Phone 3-9135 Birmingham 3, Ala.

Marietta Concrete Builds New Research and Development Laboratory

Establishment of a new Research and Product Development Laboratory at its main plant in Marietta, Ohio, to develop and test new products and to maintain a high standard of quality in existing products was announced by The Marietta Concrete Corporation.

The new laboratory is housed in a one-story building containing about 1000 square feet of floor space. The building includes two offices and laboratory facilities for testing the company's finished products and the raw materials used to manufacture them.

Robert B. Hindman has been appointed director of the laboratory. Before joining Marietta Concrete 2 years ago, he was associated with the U. S. Army Corps of Engineers, the Ohio Highway Department Testing Laboratory and the Lehigh Portland Cement Co. He served as an engineering officer with the U. S. Navy during the war.

The new laboratory is being used to maintain continuous control of quality during manufacturing operations in the company's lightweight aggregate, "BESLITE," in its precast concrete wall panels, its industrial and farm silos, and other concrete products.

Equipment installed in the laboratory enables the company to test concrete silo staves for their strength, resistance to stress, and other factors; the exterior and interior finishes of the silos for their composition, color, durability, resistance to acids, waterproofing, and other qualities; cement mixtures for their proper content, binding properties, etc.

The laboratory already has been put to work running tests on silo staves for the company's Hollywood, Fla., plant, and on precast beams and columns Marietta is furnishing for the Atomic Energy Commission Project in Pike County.

A research project underway has as its object the development of a special facing of various textures and colors for its precast wall panels.

But one of the most important tests being made in the new laboratory building is the unique construction of the building itself. Its walls consist of Styrofoam (a Dow chemical product) insulation sandwiched between two layers of pneumatically-applied concrete. The walls were erected merely by putting the Styrofoam in place and spraying the concrete to the proper thickness on each side. The result is an economically constructed, yet durable insulated concrete wall.

The new laboratory is part of an expansion program that also includes establishment of a new plant at Bowling Green, Ky., to start production in April; modernization and expansion of its plant at Charlotte, N. C., with production there scheduled to start the first of the year, and the opening last September of its plant at Hollywood, Fla.

In addition to its main plant at Marietta, Ohio, the company also operates a plant at Baltimore, Md. The expansion program will boost the company's total production and sales force to approximately 700 persons.

LOUISIANA AGRICULTURAL SUPPLY COMPANY INSTALLS 35-FOOT CONVEYOR

W. F. Williamson, Jr., treasurer of Louisiana Agricultural Supply Co., Inc., at Baton Rouge stands beside one of the firm's dry freight vans at the covered loading dock. Cautiously answering our query about business expectations this spring, he predicted rapid changes and a probability of selling more low-analysis mixes than in any recent season. At risk of life and limb we hovered between a concrete retainer wall and the side of an adjacent building several feet away to snap the photograph at the right, showing some material being released from a gondola rail car into the new screw conveyor the company installed last year. This 35-foot screw, purchased from Fertilizer Equipment Sales Co. in Atlanta and mounted in a concrete trough by the fertilizer manufacturer's own plant staff, spans a double-track rail spur and feeds the material into the basement storage bins of the plant. An elevator carries it to a similar screw mounted overhead and this screw conveys the material or mix to the mixer or to the bagging unit. Officers of the firm estimate that the savings brought about by the conveyor system are sufficient to overcome the cost in a single year. Among other modernizations at the plant are a new concrete rail loading platform (extending all the way across the back side of the building) which replaced an older wooden dock, and a new asbestos awning which covers the entire width of the concrete apron.

SOUTHERN STATES PHOSPHATE and FERTILIZER CO.
SAVANNAH, GEORGIA
Manufacturers of SULPHURIC ACID, SUPERPHOSPHATE, COMPLETE FERTILIZERS
and ALL TYPES OF BASE GOODS
EXPORT ORDERS SOLICITED

A DYNAMIC NATIONAL PROGRAM FOR SOIL AND WATER CONSERVATION

Extracts from an address by Secretary of Agriculture Ezra Taft Benson at the eighth annual convention of the National Association of Soil Conservation Districts, New Orleans, Louisiana, February 23, 1954.

I am here for the same reason that you are here—because I believe sincerely in soil conservation with all my heart and my soul.

The soil, water, range, and forest resources of the United States are the natural foundation of our national economy. From them come our food, most of our clothing, and much of our shelter. How well we protect and improve these resources will have a direct bearing on the future standards of living of the whole nation.

It is my purpose today to amplify with you this point. The effectiveness with which we meet the long-time needs of American agriculture will depend in large part on productive soils and well-managed water supplies.

Just now, when we are hearing so much about agricultural surpluses, we need to keep our perspective clear. We need to look ahead as far as we can and try to foresee the demands likely to be placed on the nation's physical agricultural plant.

The demands upon agriculture are certain to grow heavier in the years ahead. The population of the United States is increasing at a most rapid rate. Estimates of the demands 25 years from now range 25 to 40 percent greater than current production. It is conceivable, and even probable, that less than a century from now the soils of this country will need to support a population double that of today.

We do not have enough **new land** to draw on in this country to meet the expanding needs of the future. To meet rising demands, we shall have to depend mainly on increasing the **per-acre yields** on our crop and pasture land, and on our range and forest lands. But our land resources are adequate to meet our needs for a long time to come, provided we care for them properly.

We believe that a dynamic national program of research, education, technical assistance, and where needed, cost sharing in soil and water conservation is one of the basic necessities of American agriculture. It is the policy and the firm intention of the Department of Agriculture to discharge fully its part of that responsibility.

But you know, and I know, that the **final** responsibility for carrying out a sound, vigorous program of conservation rests with the people who own and operate the land. A national conservation program however urgent its need, cannot have force in a democracy unless it is accepted as the individual responsibility of the man who uses and manages the resources.

Arkell & Smiths' Elects Searle Vice-President

Robert F. Searle has been elected a vice-president in charge of production and engineering of Arkell & Smiths' plants at Canajoharie, N. Y., Wellsburg, W. Va., and Mobile, Ala.

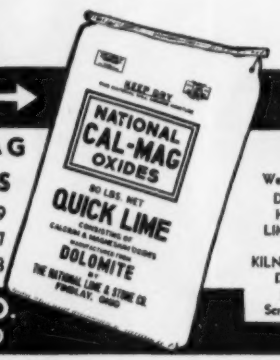
A graduate of the U. S. Naval Academy, Mr. Searle joined Arkell and Smiths, manufacturers of multiwall and specialty bags, in 1948. He was production manager of the company's Mobile plant. His headquarters will now be at Canajoharie.

CAL-MAG OXIDES
CUT YOUR COSTS WITH

Unexcelled for its superior Dehydrating, Neutralizing, and Curing factors in the preparation of better fertilizers. Write for complete information.

PROMPT SHIPMENTS
Three railroads serve our Carey, Ohio plant--assuring prompt delivery--everywhere.

CAL-MAG OXIDES
MgO 40.39
CaO 58.07
TNP 203.88



We Also Produce
DOLOMITIC HYDRATED LIME (165 TNP)
and
KILN DRIED RAW DOLOMITE (107 TNP)
Screened to size

The NATIONAL LIME and STONE CO.
General Offices • • • • • FINDLAY, OHIO

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

WANTED: 33% AMMONIUM NITRATE PREMIUM PRICES. BOX # 21, c/o COMMERCIAL FERTILIZER. 75 THIRD ST., N.W. ATLANTA, GA.

WANTED: Young college graduate in chemical engineering willing to start in production and work up by a fast growing organization in the Northwest now contemplating expansion in new process developments in the fertilizer industry. Presently operating two plants. Opportunities excellent. Box 22, c/o Commercial Fertilizer, 75 3rd St., N.W. Atlanta, Ga.

WANTED: Aggressive young man, mid 30's, now employed as superintendent in acidulation and complete fertilizer plant, to develop into assistant to manager of fertilizer division of a fast growing organization in Northwest. Must have good educational background and have clean record of getting things done. Opportunities good. Box 23, c/o Commercial Fertilizer, 75 3rd St., N.W., Atlanta, Ga.

WANTED: Plant superintendent for acidulator and fertilizer plant in Northwest. Opportunities good. This open position due to expansion in our organization. Box 24, c/o Commercial Fertilizer, 75 3rd St., N.W. Atlanta, Ga.

Wiley & Company, Inc.
Analytical and Consulting Chemists
Calvert & Read Streets
BALTIMORE 2, MD.

SHUEY & COMPANY, INC.
Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for Florida Hard Rock Phosphate Export Association. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemist for National Cottonseed Products Association.
115 E. Bay Street, Savannah, Ga.

LAW & COMPANY
Founded 1903
FERTILIZER CHEMISTS
Two Convenient Laboratories
P. O. Box 1558, Atlanta, Ga. — P. O. Box 629, Wilmington, N. C.

ALLEN'S IMT. BONE MEAL
N. 2.40% — T. P. A. 20.00%
(Not Steam Bone) $50. ton C. L.
ALLEN'S FERTO-POTS, made of Cow Manure.
ALLEN'S ORGANIC FERTILIZERS
Write for complete list and samples.
ALLEN CO. since 1915 Pittstown, N. J.

VERMICULITE FINES
(Fertilizer Conditioner)
Truck and Carload Quantities
American Vermiculite Company, Inc.
Phones 2201 & 2301
Roan Mountain, Tennessee

6 CLARK DUMP TRUCKS
6 HOUGH Model HA PAYLOADERS
Good Condition . . . .
Pay for themselves in labor savings.
Worth several times this price. Payloaders have 10 cu. ft. bucket capacity. Dump Trucks far less than you'd ordinarily expect to pay. Unbeatable values! Wire or CALL TODAY!
Payloader only $950.00 each
Trucks $1250.00 each
FOB ATLANTA
FULTON AUTO EXCHANGE
2235 STEWART AVE. S.W.
ATLANTA, GA.
Telephone FAirfax 8606

PULVERIZERS
Specializing in the reduction of
PHOSPHATE ROCKS
AGRICULTURAL LIMESTONE, ETC.
Capacities: 1 to 50 Tons per Hour
Catalogs on Request
BRADLEY PULVERIZER CO.
ALLENTOWN, PENNA.

MAGNOLIA SUFFERS TORNADO DAMAGE

Magnolia Fertilizer Co. at Vicksburg, Miss., is speeding its recovery from the effects of the tornado that slashed through that city on December 5. Although the greater portion of the business district surrounding the Magnolia plant in the downtown section was almost completely demolished, the fertilizer works escaped any great amount of direct damage.

Huge beams from a falling structure across the street were hurled through the heavy doors leading onto Magnolia's loading platform, ripping the doors off their mounting with such force that they broke loose a three-inch water main in the automatic fire sprinkler system. With the plant located in the lowest section of "The Hill City" on Levee St. alongside the waterway, the sprinkler main carried a water pressure of 125 lbs. In the panic and confusion of this major disaster, it was two hours before the flow from the broken pipe could be stopped. By this time water was standing to a depth of 16 inches in the concrete storage bins of base materials and mixes in the underground basement of the plant (see picture).

One batch of 6-8-8 mixed fertilizer was found upon analysis to have dropped to a 2-5-5 content as a result of the dousing. Other batches, when dried, proved to be too lumpy to permit screening and bagging and appeared to be a total loss unless sold in bulk for hand-spreading. Many of the bins have already been cleared, but others still require the tedious procedure of digging out the material—hardened by the wetting and subsequent drying to a rock-like mass—with pick and shovel.

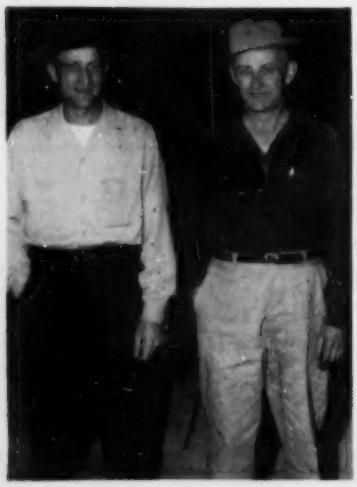
We couldn't get enough light for a decent picture, but perhaps you can get an idea of the mess which sixteen inches of standing water left in these basement storage bins at Magnolia Fertilizer Co., Vicksburg, Miss., after the recent tornado.

In the upstairs storage area, where quantities of bagged mixes lay in wait for the spring season, most of the damage came from flying fragments of glass torn from the windows by the twister's impact. Nearly all the outside layers of multiwall bags were slashed almost to shreds by the jagged particles; most, however, remained relatively intact and held the contents unspilled (see picture).

A nearby warehouse, in which Magnolia had stored a considerable amount of fertilizer in bags, lost its roof to the tornado; here damage was also heavy. (We were unable to get a photograph. Many sections of the city where tottering walls are hazardous are roped-off and only demolition crews are allowed to enter.)

Although he wouldn't admit that the storm had anything to do with his decision, C. P. Farley, Magnolia's production manager, told us that he is leaving the fertilizer business after twenty years to operate a farm at Braxton, Miss. Tom Byrd of Vicksburg is the new production manager for the firm.

George Cain of Spencer Chemical Co. and C. P. Farley, retiring (to farming) production manager of the tornado-struck Magnolia Fertilizer Co. plant at Vicksburg, Miss.



These are some of the multiwall bags of mixed fertilizer at the Magnolia Fertilizer Co. cut by flying fragments of window glass during the recent tornado at Vicksburg, Miss.

ROW CROPS TO COVER CROPS

The change in our farm production in recent years, from row crops to cover crops, has been a startling one.

A major contributing factor to this change has been the greatly increased usage of high-grade Muriate of Potash.

As the largest producer of potash in the industry, Potash Company of America is glad to participate in this progressive step.

POTASH COMPANY OF AMERICA

Carlsbad, New Mexico

General Sales Office . . . 1625 Eye Street, N.W., Washington, D. C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

UNION SPECIAL

CLOSING MACHINES for FAST LOW COST SECURE Closures!

Here is the equipment that gives you everything you want for closing bags in fertilizer plants! Specially built to stand up under heavy production schedules handling chemicals and minerals, Union Special Bag Closing Machines also provide the high output rates . . . low packaging costs . . . and strong, efficient closures needed to meet modern competitive conditions. It *pays* to use UNION SPECIALS!

ASK FOR YOUR COPY OF THIS NEW BULLETIN.

Use this new 16 page illustrated bulletin to quickly select the right machine for the job! It contains complete data on sewing heads, columns, conveyors, accessories, and overall dimensions, plus more than fifty illustrations of Union Special machines, plant installations, and types of closures. ASK FOR YOUR COPY NOW.

Union Special MACHINE COMPANY

612 NORTH MICHIGAN STREET • CHICAGO 10, ILLINOIS